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PRIZE ESSAY

ON

DIPHTHERIA.

McNEIL.

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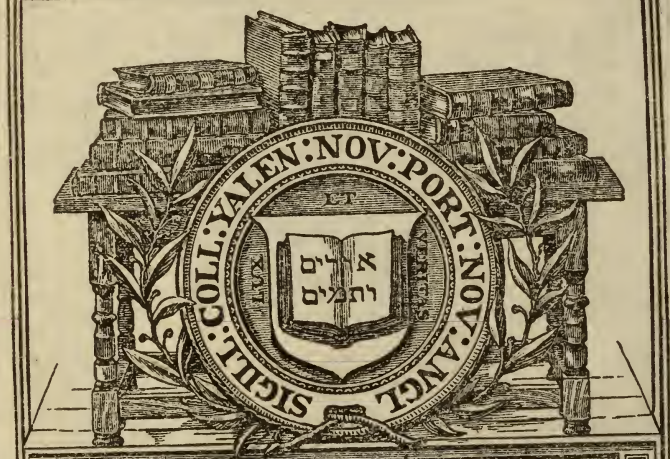

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B. H. Cheney

A TREATISE

ON

DIPHTHERIA:

ITS

HISTORY, ETIOLOGY, VARIETIES,

PATHOLOGY, SEQUELÆ, DIAGNOSIS,

AND

HOMŒOPATHIC THERAPEUTICS.

By A. McNEIL, M.D.

A PRIZE ESSAY.

CHICAGO:
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1881.

PUBLISHERS' ANNOUNCEMENT.

Recently we offered a prize of *One Hundred Dollars* for the best Treatise on Diphtheria. We were assured that, if the whole subject in all of its details was gone over in a concise and practical manner by a competent physician, it would supply a pressing want in our literature.

The essays of the contestants were submitted, by number, to a committee of well-known veteran physicians, who sent us the following report:

This is to certify, that we have examined the papers on Diphtheria numbered respectively, as submitted to us by Duncan Bros., and that we give the preference to that marked No. II.

GEO. E. SHIPMAN, M.D.
D. S. SMITH, M.D.
A. E. SMALL, M.D.

The successful MS. was written by A. McNeil, M.D., a well-known physician of large experience.

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PREFACE.

In presenting another work on Diphtheria, it is due the profession that I should tell them my purpose. It has been my aim to draw from every available source. I have taken from the rich treasures accumulated by those industrious and accurate German pathologists, to which the most of our American practitioners have not the key. I have thus been enabled to throw a light on what has been productive of evil, as the cause of much routine and fallacious treatment, viz., the germ theory. The careful experiments I have quoted show conclusively that the theory is an unreliable hypothesis. Thus, another fortress that was to make the position of pure Homœopathy untenable vanishes like a morning dream. By the same aid I have traced up the results of tracheotomy. With such figures before us can we resort to this expedient? I think not.

In the treatment, I have drawn from many sources, some of which have never been before presented to the

profession. I have shown that many of the expedients to remove a single symptom, viz., the pseudo-membrane are only successful in torturing the patient. There is but one way for us to travel, viz., that surveyed and built by Hahnemann, to give *the* remedy in the minimal dose that corresponds most nearly to the totality of the symptoms; no gargles, no swabs, no caustics, no specifics. If we do so, our success will be as superior to that of our colleagues of the other School, as was Hahnemann's to that of his contemporaries.

A. McNeil.

April, 1881.

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DIPHTHERIA.

CHAPTER I.

INTRODUCTION.

Diphtheria is a specific, contagious disease of which the chief characteristic is the production of epithelial changes and fibrinous exudations on the mucous membranes and more rarely on the skin.

HISTORY.

It has a history of nearly 2000 years, although it occasionally disappears during long intervals. It was described by Aretæus, of Cappadocia, about the end of the first century of the Christian era. Galen also observed it. Asclepiades even performed laryngotomy on his diphtheritic patients. Cælius Aurelianus was acquainted with it and mentions paralysis of the soft palate as one of its sequlæ. During the middle ages, we lose sight of it either because of its absence, or

more probably owing to the imperfect records of that period. It first re-appeared in Holland, in 1557, and in Naples and Sicily in 1563, and in the next year it spread to Constantinople. Epidemics occurred in Cologne and Augsburg in 1565, and in Paris, in1576. In Spain it prevailed at intervals from 1583 till 1613.

It appeared in New England in 1671, and was described as follows: "They (the English colonists) are troubled with a disease in the mouth and throat which proves mortal to some in a very short time. Quinsies and impostumations of the almonds (tonsils) with great distempers of cold." We cannot fail to recognize diphtheria in the following description from "Moore and Parish's Compendious History of New England," in speaking of a disease which made its appearance in the year 1735. "The throat swelled with white and ash-colored spots, an effloresence appeared on the skin; a great weakness seized the entire system, and a great tendency to putridity set in."

Bretonneau, however, was the first to give an accurate description of the disease, which he did in a paper read by him before the French Academy of Medicine, in 1821. Since then, the literature of this disease has become almost unlimited. Many have contributed to our present knowledge of diphtheria. It is sad to think, however, that notwithstanding what our colleagues of the

regular school have done in giving us vivid descriptions and scientific pathology of diphtheria, yet they themselves acknowlege that they are almost helpless in treating it. Their therapeutics has been as varied as different human minds could devise. One condemns what the other praises till "all is confusion, worse confounded." But the divine law of *similia*, has brought order out of chaos.

GEOGRAPHY.

Diphtheria has been in every part of the world. It has prevailed in every country in Europe, from the semi-tropical climate of Southern Spain to the Baltic Provinces of Russia, and at every season so that in Italy it has been supposed that the progress of the disease was favored by the heat of summer, and in the north of Europe, the winter has been considered the chosen season for its ravages.

In Asia, Aretæus was the first who gave us any reliable information, though Syria was its favorite abode. It has occurred, but not extensively in Hindostan. China has recently felt the scourge, although we have no information that it has long existed there.

It was also known early in the Christian era in Africa. It was called owing to its prevalence in Egypt, "ulcus Egyptycum." In the interior of the continent it is yet

unknown, but probably this immunity is owing to the non-importation of the disease.

In America, both North and South, it is known and dreaded, having prevailed from an early period of their history, with some intervals till the present time. I have already mentioned its existence in the early colonial history of New England. And it has since raged in every part of the United States. In Mexico, it is no stranger, having spread in the capital and even on the lofty plateaus of the Cordilleras. It has ravaged Vera Cruz. In the West Indies, it has existed for the last century, and in 1850 and 1853 ravaged Havana. Tschudi in speaking of the disease in Peru, says, that in the coast region it extended over a distance of 500 leagues, and from the level of the sea to 3000 feet above its surface, and in the eastern Sierras to a height of 11,000 to 14,000 feet. Dr. Odriozola reports an epidemic that prevailed almost exclusively among the rich inhabitants, who had all the comforts of life, and that it did not attack a single negro, although in the coast region, it chose as its victims the young negroes on the plantations. In Brazil it is almost unknown.

Within a few years it has appeared in Australia and Van Dieman's Land, and has taken up its abode in both.

I here translate Seitz's resume of the history and

geography of diphtheria. "Croup und Diphtheria." Seitz, 270.

"Diphtheria is one of the oldest epidemic diseases. We find ever since the awakening of independent observation in medicine, in the 16th century, information of its epidemic character in Europe.

"According to the descriptions of its appearance at that time, its symptoms have remained exactly the same till the present. Characteristic of diphtheria is its disappearance for a time, and in fact, for a longer period than has been observed of other diseases.

"After such an absence in the beginning of this century, it has since the second decade, spread first in France, and afterwards in England, and since the fifth, over the rest of Europe and the remaining parts of the world.

"It occurs in all regions, from the North to the South Pole. As it is not dependent on climate, neither is it on local situation nor on the condition of the soil. It is at home at the level of the sea, as well as on the mountains, 10,000 feet high; on islands and in the interior of continents.

"Numerous facts indicate that it sometimes has an autochthonus origin, and then spreads by contagion. Like other contagious diseases it is carried by sea. It therefore appeared in the litoral countries of Spain,

Portugal and Italy, in the 16th and 17th centuries, in great epidemics. In England, it was first observed in an epidemic form, in West Haverford, near the frequented part of Milford, in South Wales. Also in Germany it, first appeared as an epidemic, on the coasts of the North and Baltic Seas, in the fifth decade of this century. In other parts of the world, islands and coasts, as the West Indies, the shores of Africa, the Eastern and Western shores of America were especially visited by it.

"In its progress through the interior of continents, it is not confined to the routes of commerce, as railroads, highways, or water routes. Neither have the prevailing winds any influence. In one country it makes its march from north to south, as not long ago in Germany, in others it goes in the other direction. As in England it, first appeared as an epidemic in South Wales, and only seven years afterwards, in the Northern Counties. In France it assumed an epidemic form, in the interior, at Tours, and afterwards moved in all directions, southwards into the department of the Lot, northwesterly into the Campagne, northward to Paris and Arras, and westward to Nantes. Also, lately it became epidemic, first in Florence, in Middle Italy, and several years afterwards in Milan, and in other neighboring places.

"Sporadic cases for a longer or shorter time always precede, both in cities and countries, the epidemic appearance of the disease. These are usually of great intensity. Generally, at first only children are attacked, and afterwards adults are seized. In a large city, as in an entire country, some time elapses before the disease becomes general. After it has reached its maximum the number of cases decreases but not steadily. Repeatedly, new outbreaks have taken place in entire regions, as in Holland, Schleswig, Holstein and in large cities, as in Paris and Munich, during the last decade.

"In all great cities in which it has appeared, it has taken up its abode: How long it will remain in this country we cannot estimate. In Spain and Italy during the 16th and 17th centuries, it continued for three or four decades.

"We perceive by the foregoing, that diphtheria defies all climactic, geographical, and sanitary influences. It fairly revels in anomalies and contradictions. The cold of the frigid zone, the heat of the torrid; the altitude of mountains, the level of marshes; the dryness of Peru, the moisture of Holland; the filth of cities, the purity of the steppes are alike to this destroying Herod among the innocents."

Its devastating ravages for decades, where it has come from no one knows, and its disappearance without leav-

ing a trace except the graves of its victims, all go to show that there are some occult influences at work, ot which medical science knows but little. Some noble men whose names should be canonized as saints have been groping amid the thick darkness towards the light. But their individual exertions have been insufficient except to point the way to the brightness which has been thrown around the other departments of knowledge. Eisenman in the "*Vegatative Krankheiten*" and Horn "*Ueber Krankheitserzeugung durch erdmagnetesche, electrische und atmospherische Einflusse*" und *Nachweise der Ursache und des Wesens des Cholera.* This brings us to the etiology of diphtheria.

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CHAPTER II.

ETIOLOGY.

Eisenmann divides fevers into four classes, dynamic, didynamic, adynamic, and septic, the didynamic being an intensified form of the dynamic. Diphtheria belongs according to its virulence to the two latter classes. It is therefore produced by the atmospheric conditions which beget these types of disease. We find that diseases belonging to these classes prevail at the same time as diphtheria. I adduce a few examples. In 1874, diphtheria raged in Hungary. In the communities in which it occurred there were 139,414 inhabitants, 3,774 sickened with it, of whom 1,938 *i. e.*, 51 per cent died. At the same time cholera, small pox, measles, typhus and whooping cough prevailed.—"Statischen Jahrbuck fur Ungarn." In an epidemic of diphtheria, reported by Goldschmidt, in the *American Journal of Medical Sciences*, for 1861, page 392, there prevailed at the same time typhus, typhoid fever and typhoid pneumonia. In New Orleans, diphtheria occurred simultaneously

with typhoid in an epidemic from 1856 to 1860. Many other like occurrences might be mentioned, showing that there is an ætiological relation between diphtheria, typhoid fever, small pox and the like. It is then incumbent on us to inquire what are the conditions which produce these diseases. One of the most important factors in the production of these diseases is a predominantly negative electric state of the atmosphere.

I quote from the *North American Journal of Homœopathy*, Vol. VII, page 185. "Negative electricity polarizes the nitrogen of the atmosphere, or produces an antizonic condition of the air. The blood becomes more venous, blue, even black as tar (carbonized.) It becomes lymphatic, albuminous and watery. Its *fibrine decomposes and disposed to exudation through the capillary walls.* The vascular system becomes relaxed and paralyzed, and therefore, passive hæmorrhages take place. Consequently whenever an intense negative electricity prevails, hæmorrhages, abortions, morbus niger Hippocratis, apoplexy, headaches and the like occur, because of the increased pressure of blood to the head.

"The blood loses its irritability, the vascular system consequently is with difficulty excited to febrile movements [and when they do occur are always of a torpid character.—AUTHOR] and the organism often bears for a long time profound disturbances without manifest-

ing much febrile reaction or other positive morbid phenomena.

"There occur during the prevalence of negative electricity, spasms, faintness, and vertigo. Diseases of the brain and spinal cord are frequent.

"The mental powers are duller, but little disposition to intellectual labor is present, the spirits are depressed, many persons complain of an unpleasant nervous excitement without any apparent cause, consequently hysterical people and hypochondriacs are worse than usual and may be on the verge of distraction."

We perceive that this condition of the atmosphere produces adynamic and septic diseases, to which as I have already mentioned diphtheria belongs. When these adynamic and septic diseases prevail, diphtheria, typhus, scarlatina, small-pox and the like, there will be an absence of pure inflammations. Those which do exist will speedily degenerate into a low type.

That cold and dampness favor the origin and spread of diphtheria has been quite usually accepted, but is by no means sustained by a careful study of the history of the disease. Most observers have seen a greater prevalence of the disease during the cold and damp seasons, yet many others have thought that it showed a preference for the hot and dry period of the year. In most of the epidemics, there was a perceptible amelioration

during the hot months, to break out with great violence as the autumn began. In the Hopital des Enfans, of Paris, in the year 1858, during the fall and winter there were 110 cases, while during the remaining six spring and summer months, there were only forty-three. There was also observed a greater disposition in the disease to attack the larnyx and bronchia in the fall and winter. During the years 1859 and 1860, about the same proportion occurred. In Bavaria, during the greatest prevalence of the epidemic in the years 1868 and 1869, the mortality was a half greater during the colder months. In Munich, from 1864 to 1869, of the whole number of 538 fatal cases, 333 occurred from October to April, and 205 during the spring and summer months. Seitz's 600 cases show about the same proportion in favor of the colder seasons of the year. On the other hand in Florence, in 1871 and in Milan in 1873 and 1874, a greater number of cases were seen during the spring and summer months. Hirsh, who has traced up 109 epidemics of angina maligna, found the proportion in the different seasons was not materially different, thirty-six began in the spring, twenty in the summer, twenty-six in autumn and twenty-seven in winter. Some observers think that the summer heat favors the development of diphtheria, others the contrary. The last appearance of the disease in Lombardy, showed

its independence of meteoric influence. The temparature and the moisture of the air appeared to have no influence on it. I might go on to an indefinite length to show that one epidemic appeared to owe its origin to heat, another to cold; one to dryness and the other to moisture, all of which go to prove that the weather has little or no influence on the disease, nor has the weight of the atmosphere, as shown by the barometer, any influence on it.

The location, as regards elevation and the moisture and constituents of the soil, appears to be equally unimportant. It has been observed in Bavaria, in the villages on the Danube and the Main, as well as high in the mountains. It has raged in the vicinity of the sea, in England, Germany, Holstein, on the coasts of the North and Baltic seas. And yet Tschudi reports that diphtheria is endemic on the Eastern Sierras of Peru, 8,000 to 11,000 feet above the level of the sea. The moisture of the earth has but little influence on it. While it has appeared to follow inundations in some places, yet it has flourished on dry heaths and on fruitful cultivated uplands. Whether the soil is sandy, calcareous or argillaceous is immaterial to this ubiquitous monster. Bartle mentions that, in Holstein, on the wet marshy districts, on the dry barren regions, on the most tenacious clays, and on the most arid sands, the disease pre-

vailed to an equal extent. Some physicians have ascribed the origin of some epidemics to previous inundations. Dr. L. Grace, imputed that at Sontra, to an overflow which continued for six weeks. The first case occured in the lowest part of the city, which had never before been flooded in the memory of man, in a house which had been completely saturated. Of the seven neighboring localities which were also visited by the disease, six had been overflowed and the seventh owed its scourging to importation. Other observers are of the opinion that the disease owes its origin to the wet situation of houses, in damp swampy ground, in the neighborhood of rivers. On the other hand in Italy, in the vicinity of Florence, it has been observed that it occurs more in dry, long-built houses than in damp, cold, newly constructed ones. Greenhow, and other English physicians have ascribed a greater tendency to the disease in new damp buildings, while in the city of Essens, in East Friesland, the newly built portion of the city has escaped more lightly. Seitz saw no difference in the damp houses and the dry ones.

Many authors mention the influence of decomposing organic matter, in begetting the disease, and increasing its intensity, as in other zymotic diseases, particularly typhus. Crighton mentions as a striking fact that in the epidemic in Scotland, in 1859, the majority of the

cases occurred in the same houses which were visited by typhus in 1854 and 1857, the vaults and sewers, of which were in a bad condition. Many other cases might be adduced to confirm this fact that the decomposition of organic matter conduces to the origin and spread of diphtheria, although putrefaction is by no means sufficient by itself to produce or spread the disease, if the previously mentioned atmospheric conditions are not also present.

The accumulation of people in poor, closely-confined tenements, imperfectly lighted and ventilated, favors the spread of the disease, although there are some well established reports which appear to favor the contrary. Trousseau, Loncq, Greenhow and Nesti, found that the disease occurred as well in the palaces of wealth, as in the hovels of poverty. And Loncq even observed that in epidemics in Arnheim, Nymwegen and Haarlem, in Holland, the well-to-do classes suffered more than the poor. The same condition was found in Lima, in 1858, and in Edinburg, in 1871. Seitz saw the disease among the rich and poor in all grades of society.

Sex has no appreciable influence. Nationality and race have but little to do with it. Although one author reports that in Peru, the Indians were not attacked. The Jews have been spared in some epidemics, but only to be more severely scourged than their Gentile neigh-

bors in others. The Chinese remained unaffected, in epidemics in Victoria and Australia, although China has been severely afflicted.

The anæmic and the plethoric are alike susceptible. Those who are subject to catarrhal inflammation of the throat, or whose tonsils are enlarged, are peculiarly liable, which has been attributed to the greater tendency of the infecting germs, of whatever character they may be, to lodge on the tonsils, in inspiration. Those who have once had the disease, remain more susceptible afterwards, which is a well marked difference from the eruptive fevers, as they confer immunity.

Nearly all observers consider diphtheria contagious. Bretonneau thought that, like syphilis, it was only communicated by direct contact of the false membrane with denuded surfaces or mucous membranes. That it may be propagated in this way is conclusively proven by the infection of many physicians, who in performing tracheotomy in this disease, received the pseudo-membrane into the mouth and throat, as in sucking out the canula, or by the patient's coughing in the face of his attendant, pieces of the exudation being received into the mouth. A long list, many of them bright lights of the profession, might be given of those who thus fell a sacrifice, in the performance of their duties. Experimenters have inoculated a great number of ani-

mals with the pseudo-membrane, and thus reproduced the disease. But it has been many times communicated without the exudations touching abrasions or mucous membrane, as in other contagious diseases. It is spread by contact with articles to which the virus adheres, (but there is little or no danger of the disease being carried by the physician); or through the atmosphere of the sick room, particularly where patients are a long time in the apartments, without the necessary cleanliness or the proper ventilation. Numerous observations prove that the disease has been imported by patients, into healthy localities, from points at which it existed.

A domestic who had contracted the disease in Florence, conveyed it to her home in the province of Siena. Three members of her family sickened soon after her arrival. Frequently, during the prevalence of the disease, it has been observed that when a case in a family occurs, other members of it, particularly children are attacked. This happens more frequently, among the poor, where they are crowded together in close unclean apartments. But it has happened among the wealthy, that not only the children, but the servants and the parents are stricken down soon after the first case. I might prove this by many citations. We should therefore do all we can to isolate the patient from the rest of the family, particularly the children. But most of

all we should guard against others coming into close contact with the sick, as in kissing, fondling, or inhaling the patient's breath. The too common custom of visiting the sick has many times spread the disease.

The diffusibility of the contagious matter is much less than that of the eruptive fevers. In most cases it is only by inhaling the patient's breath or other exhalations, that the disease is communicated. It is therefore much easier to guard the other members of the family than it is with those fevers. Owing to this peculiarity, the disease does not spread as rapidly as other contagious diseases, and sometimes it is limited to a small locality, so that some observers have supposed that it was not contagious, although the great weight of testimony shows that it is.

Does this disease ever have an autochthonous origin? Many facts answer affirmatively. In no other way can the beginning of the disease in some quarters be accounted for. Hickes says, that an epidemic broke out at Kingston, in the colony of Massachusetts Bay, in 1735, which was a small place destitute of commerce and six miles from the coast. It then appeared at Exeter, six miles northeast, a month later in Boston, fifty miles on the southeast, and still a month afterwards in Chester, six miles west. It did not follow the routes of travel, and completely avoided some places in its

tract. So does the gradual spread of diphtheria in England in this century, from local foci and isolated cases. Its appearance in the rural districts before it appeared in the neighboring commercial cities, all indicate the spontaneous origin of the disease. Radcliffe who reported these epidemics in England, could see but little of the spread of the disease that was owing to contagion. For a long time before the appearance of the epidemic, sporadic cases occurred, forming scattered and isolated foci, and the gradual spread of the disease, indicate that the producing causes only developed slowly and gradually over the kingdom. The prevalence of other diseases whose seat was the same as that of diphtheria, as laryngitis, croup and scarlet fever at the same time justify us in believing that there were unknown causes at work which do not exist at other times. The history of the epidemic leads me to believe that the first cases developed without importation. The history of diphtheria in Tasmania, the first two cases of which appeared in the interior, far removed from each other, and without any discoverable communication with other countries, point to an autochthonous origin.

BACTERIA.

An important question in the ætiology of diphtheria

is, Are the bacteria which exist in the diseased mucous membrane, and which penetrate even the entire system, the producers or the product of the disease? Able champions have entered the arena on both sides, to combat for their respective views. Oertel says, in summing up after stating much testimony in behalf of his views, "Returning now to the original question, there can no longer be a doubt, after the statement of such facts, that these vegetable organisms are not of accidental occurrence, but are inseparable from the diphtheritic process, just as the bacteria of decomposition are necessarily connected with decay, and act as a ferment of it. *Without micrococci there can be no diphtheria.* (Eberth). We find them in the very smallest and most superficial plaques, we see them in immense collections in the tissues; we meet them again in embolism as the cause of metastatic abscess, and the intensity of the toxic infection increases with the number of these organisms." Ziemssen, Vol. I., p. 592. Dr. W. Albert Haupt, who maintains that bacteria are the cause of diphtheria, proposes the following experiments: "Take," the doctor says, "several healthy dogs, and draw a few drops of blood from each, and ascertain by a good microscope (the old instruments with insufficient defining power, are useless), that there are no bacteria in the blood between, or in the blood corpuscles. Then

take a couple of little pieces of pseudo-membrane from the throat of a patient suffering from diphtheria, which has not been touched by any parasite killing drugs, and again convince yourself of the presence of micrococci diphtheritica in these pieces by the microscope, the discovery of the fungi is not difficult. I have prepared a great number of microscopic preparations of diphtheritic membrane, and I always found the bacteria in them. They are visible by a microscope enlarging 650 times. (Hartnack, Ocular 4, System 8), singly or in groups of from two to six, or united into balls, heaps, and strips, oval granules (spherical bacteria) of scarcely the 001. of a millimetre. Inoculate into the trachea of a dog, and at the same time inoculate in another dog, with putrid flesh, and afterwards operate on still another with membrane soaked a couple of hours in the 2d decimal dilution of Carbolic acid, prepared with water, then leave the dogs to their fate. No. 1 will soon show the characteristic exudation and local destruction of tissue, and will certainly die in a couple of days, while Nos. 2 and 3 will only have a slight transitory inflammation at the point of inoculation without any noteworthy alteration of health. When No. 1 is nearly dead, make another examination of his blood in order to discover if micrococci are present. You will find that they are six times as numerous as the red cor-

puscles. An autopsy and microscopical examination will reveal bacteria in the cellular tissue surrounding the wound, in the trachea in immense masses, and their migration may be followed into the trunk where they will be found in the muscles, lymphatic glands, in the nerve sheaths of the liver, heart and kidneys. Nassiolf found them even in the cartilages and bones." *Allg. Hom. Zeitung*, Band. 72, Seite 39.

Oertel performed similar experiments with like results. Eberth, one of the champions of the theory, said, " Without bacteria there can be no diphtheria."

The opponents of the theory claim that these experiments are not conclusive, that there is a weak link in the chain. They say, in order to prove that the bacteria are the cause of diphtheria, they should be completely isolated from the pseudo-membrane and then inoculated, and that the membrane completely freed from all traces of the fungi by means which do not affect their pathogenetic properties should also be introduced into the veins. If the bacteria then produce the disease, it will mean something in favor of the theory. They contend that the experiments as performed, prove that the disease is contagious, and nothing more. Let us examine experiments performed in this way. Schneider endeavors to prove, (Grundzuge der Ætiologische Diagnostik, S. 66), that the bacte-

ria or algia existed in men and animals, and even in plants, when there was not present any disease imputed to these parasites. He appeals to Virchow's testimony to show that bacteria were present in the alimentary canal of one poisoned by Arsenic as well as in those who had died of cholera. His view is that they were the concomitants and not the cause of the disease with which they were found associated. He also shows that the bacteria and algia, although sometimes present before the disease occurred, yet they did no harm. And that they were not always *present* in diphtheria. He argues from evidence, that they were neither the mechanical nor chemical cause of the disease; nor did they secrete any matter, withdraw any of the constituents of the healthy organism, or generate putrefaction. He mentions other reasons, showing that bacteria found in the diseased system could not be the cause of the disease imputed to them. And he moreover discovered their identity in many different diseases. He also shows that these diseases owed their production to predisposing and exciting causes; and they sometimes take their origin *de novo*, and at other times were caused by spontaneous and artificially produced causes. And finally many well known poisons produced the likeness of these diseases.

Leflet and Julian showed by experiments that the

bacteria of animal and vegetable matter *had no deliritous effects whatever*. Comp. Rendu de l'Academie, Aout. 186.

Against the view which considers these minute organisms as the cause of the disease militates the fact that in recently discharged diphtheritic shreds of mucous and tissues from the respiratory tract, particularly when the exudation is primary, either with or without subsequent affection of the pharynx, the bacteria are either not present at all, or are in very small numbers; at all events they are incomparably fewer than when the fauces are affected.

Traube and Gscheitel found the warm blooded animals bear the injection of considerable numbers of bacteria without any serious injury. Arterial blood taken carefully from a pup, so as to exclude the entrance of bacteria from the atmosphere, into whose veins twenty-four or forty-eight hours previously, one and a half centigrammes of fluid containing bacteria had been injected, did not putrefy for months. *Schles. fur vaterlandische Kultur*, 1870.

Laborde found no bacteria in the blood of a healthy dog, the cruralis of which he had connected with that of a dog infected by the injection of septicæmic blood in his veins, notwithstanding the most careful investigation after his death. And not even where the putrid

mass had been injected directly into the veins. The bacteria were quickly destroyed in the circulation. *Gaz. de Paris*, p. 71, 1871.

Kusner employed, in order to obtain a filtrate free from bacteria, a glass funnel in which there were two layers of filtering paper; the neck of the funnel was densely filled with boiled cotton; through this he passed ichor of different kinds (pyæmic pus, puerperal and peritoneal secretion) containing bacteria in considerable numbers. Microscopic examination as well as cultivation, showed that there was in the filtered fluid no trace of bacteria, notwithstanding, the injection of this liquid free from bacteria, always had the same effect as that containing the parasites, viz., death in a short time. Dissection revealed the same condition in both cases, viz., ichorous infiltration of the cellular tissues. In the blood and large abdominal glands there was no bacteria found in either case. Med. Cent. Blatt, Band VI., Seite 32.

Hiller separated the bacteria by different methods from the fluids which contained them, and found that in every case the injection of the parasites alone *was innoxious*. The next day after the operation fungi were found in the blood, but never afterwards. Skin wounds of dogs, wet with liquid containing the micrococci and covered with gutta percha paper healed without secret-

ing pus. Subcutaneous injections of the liquid did not cause the purulent process. He even made on himself subcutaneous injections of liquid containing bacteria to the amount of a grain, without any local or constitutional injury. Healthy wounds secreting laudable pus covered with isolated masses of bacteria continued to heal as before. But the filtered fluid free from bacteria, or the unfiltered putrid liquids, when so applied, soon produced the well known local and general effects of septicæmia, when applied to recent wounds, but on old granulating ones frequently no harm was done. Hiller asserts emphatically, also, that these washed bacteria multiplied on cultivation. *Allg. Med. Central Zeitung*, No. 1, 1874, und *Chirurgical Central Blatt*, Band I., Seite 33.

Billroth was convinced that all of the vegetable organisms in the secretions, exudations and tissues of living men are not morphologically different from those developed in putrefaction of dead tissues. He further says "there has not been discovered any morphological characteristic by which we can conclude that any one form of micrococci or bacteria can be produced by this or that disease in the living body. The vital processes maintain the tissues, fluids, and to a less degree the secretions, in such a condition that they may be considered as serving as nutrition for bacteria." He him-

self injected liquids containing bacteria into the blood of living dogs, but could never demonstrate any development of the parasites therein. "There is," he says, "no clearly established observation that bacteria occurs in the blood of healthy or sick men." His own searches were negative also in pyæmia, even after death, if putrefaction was not present. And even in anthrax (Milzbrand) the constant presence of bacteria in the blood is doubtful, at all events, their presence is only accidental. They exist in the pus of wounds only when it has reached a condition of decomposition. Certain inflammations (erysipelas, phlegmons, or diphtheria) must occur in order that the parasites may multiply luxuriantly. (Untersuchung uber die Vegetations formen der Cocco-bacteria.)

I have proven by the best known medical authorities the untenability of the bacteria theory; and that these unoffending organsms are not the cause but the effect of diphtheria. I must here mention the strongest of all the testimony yet adduced, viz., the thousands of unmistakable cures, not recoveries, by Homœopathic medicines, that could not have killed the parasites directly, but only by restoring the system to health, when they died or disappeared, as the soil was no longer fit for their growth and nutrition.

I have treated this point at considerable length as it is

very closely related to the therapeutics of the disease, for if the bacteria theory is true, we would be compelled to resort to gargling, cauterization, and large doses of drugs capable of destroying the fungi. But science has given in her testimony, and pure Homœopathy stands vindicated as she has been many times before by the same witness.

Impure air either from sewer gases, close, overheated rooms, or those which are overcrowded, favors the spread of the disease; although this is secondary, yet it is well worthy of our attention. But it is only by cleanliness and ventilation that we can hope to preserve health. The history of the yellow fever epidemic of 1878 has shown conclusively that the usual disinfectants are useless and positively injurious. Ozone is the only disinfectant that promises anything in this disease, but its manufacture and use have not yet become sufficiently trustworthy and favorable. This is one of the most promising fields in medical chemistry. To give us this agent in such a form that it may be used in the sick-room, and in districts infected by this or other putrid or septic diseases, would be a noble achievement.

We perceive that the ætiology of diphtheria is in many respects anomalous, and even apparently contradictory. It is much easier to say that certain influences

which have been supposed to produce the disease are not the cause of it, than it is to prove positively what is the cause. On summing up our investigations, we perceive that climatic influences are unimportant; that the humidity of the soil is of little moment; that neither heat nor cold produce nor destroy it; that elevation above the sea is immaterial; that bacteria are not the cause nor essence of the disease, nor even inseparably connected with it; that its contagiousness is established; that one attack does not protect against subsequent ones, but on the contrary predispose to them; that there is more rationality in its being produced and propagated by telluric influences, as electricity, terrestial magnetism and evaporation, and that their study offers the most promising field for investigation, and that the disease may have an autochthonous origin.

CHAPTER III.

SYMPTOMOTOLOGY.

There is a very wide range in cases of diphtheria, both in the symptoms and the virulence of the disease. One may be mild and free from danger, while another is severe and almost certainly fatal. The individual symptoms of these cases are so unlike as to make it appear as if the patients were suffering from different diseases. But even in the most benignant there is such a disposition to rapid changes that we can never feel that our patient is perfectly safe, for in an hour or two all may be altered, new symptoms may have set in and the old increased in severity to an alarming degree.

The most natural classification of diphtheria is that which divides it into three varieties, the simple, the malignant, and the croupous or laryngeal. The difference between the simple and the malignant, is one of intensity, so that they insensibly pass into each other. While in the laryngeal variety the false membrane extends into the respiratory tract instead of being on the fauces

alone. Thereby the symptoms are different in many respects.

The *simple* variety is characterized by the absence of high fever and other symptoms which indicate a deep affection of the fluids of the body, as well as of croupal cough, dyspnœa, etc. Pain, however, may be more severe than in the more violent forms. The pseudo-membrane is usually confined to the fauces. This form of diphtheria ends in recovery within two weeks, although it may be followed by obstinate sequela, or pass into either of the other varieties.

The subjective symptoms do not differ materially from those of a simple angina. The premonitory symptoms, which precede a day or two, are tired feelings; aching in the bones; malaise; headache; loss of appetite, and sometimes nausea and vomiting. Frequently there is slight chilliness, but it is rarely that there is a well marked chill. At the expiration of twenty-four to forty-eight hours, soreness of the throat with difficulty of swallowing appears. This latter symptom varies much in its intensity. Sometimes it is not severe enough to call attention in that direction, but in other cases it is intense. On looking into the throat at this time, usually one or the other tonsil, or more rarely other parts will be found to be red and swollen. The cervical and submaxillary glands are usually somewhat

tender and enlarged, but not nearly as much sc as in the malignant form. Generally within two or three days and sometimes earlier after the soreness of the throat is perceived there will be found on examination small spots of a white or yellowish color. In from twenty-four to forty-eight hours more, these spots will have increased in size so as to have co-alesced. During this time the chilliness has passed into fever of a moderate degree, the pulse rises to 100 or 120 per minute, and the temperature in the axilla marks from 100 to 102. The salivary glands may have taken an increased action to the extent of salivation. The breath is more or less offensive. By considering this symptom, in connection with those already mentioned, we may arrive at our diagonsis without com pelling little children to submit to an examination of the tonsils. If the physician knows that he is not susceptable to the virus, however, he can differentiate between diphtheria and simple angina by inhaling the little ones breath, and that perceiving the fetor of diphtheria if it be present.

Permit me here to say a word in favor of gentleness with children. We are justified in abating somewhat from rigid, physical examinations, even if our diagnosis should not be scientiffically accurate. We will thereby be able to prescribe much more successfully. By maintaining the child's composure we can see all the symptoms of at-

titude, expression, disposition and the like that in a frightened one we could not discover at all, Guernsey has won well earned laurels by discovering and collecting a class of characteristic symptoms which may be called objective, but yet have all the accuracy and value of the best described subjective ones. To find these in a child we must leave him unirritated by officious interference.

Diarrhœa is seldom present. The urine is scanty and high-colored, and may contain albumen. Opinions differ as to the importance of this symptom. Oertel says that its presence in a child indicates severity and danger, in proportion to its quantity and persistence. Jacobi, that it may be present in the lightest, and absent in the gravest cases. Seitz, that albumen may be found in mild cases, but not often, and then only for a short time. It is more rational to believe that it is an important symptom and indicative of danger, through serious lesion of the kidneys, if present in large quantities, or for a considerable time.

In a small proportion of the cases an eruption appears on the skin from the first to the third day. This more nearly resembles measles than that of any other eruption. It may however complicate the diagnosis by its close resemblance to that of scarlet fever. This usually passes off in two or three days, being a much

shorter time than in scarlatina, and without being followed by any aggravation as happens in that disease when the eruption disappears prematurely. Its presence has no relation to the severity of the case, and its appearance brings no relief, as in the eruptive fevers; it is rarely followed by desquamation.

Two or three days after this simple form has reached its height, it usually passes into convalesence, by an amelioration of all the symptoms; the fever abates the skin becomes cool, the false membrane falls off, the urine becomes clear and more profuse, and the appetite returns. In short all the symptoms decrease in violence and health returns. But at times, unfortunately, instead of this improvement, either by imprudence, on the part of the patient, or without any discernable cause this form passes into either of the more dangerous varieties.

Croupal, or Laryngeal Diphtheria.—I translate Seitz's masterly description of this form as the latest and most scientific, Croup und Diphtheria, Seite 313:

"I now begin the description of the worst form of this disease, its extension to the larynx, trachea, bronchia or lungs. It is observed more or less frequently in every epidemic, and occurs more often in children than in adults. It appeared in fifty-six of my cases, thirty-

four of whom, *i. e.*, 62.96 per cent. died. As in other localities most of the fatal cases were of this form.

"The participation of the respiratory tract in the morbid process manifests itself in different ways, according to the time of its appearence, its extent and intensity. In many cases it appeared at the beginning, or soon after the difficulty of swallowing was observed, or in from, two to four days with dry cough and hoarseness, in others these symptoms set in from the fourth to the sixth day, in many during the second week and more rarely still, later.

"When the larnyx is attacked there occurs in addition to the general symptoms of diphtheria which have already been described, long drawn respirations; dry, loud and frequent cough, and rough hoarse voice, (all showing a striking resemblance to true croup). As in croup, so in this complication the disease is aggravated at night, or appears during sleep in sudden violent paroxysms, [Lachesis, AUTHOR].

"Respiration is difficult, the cough assumes a peculiar barking, shrill or croupy sound. The dyspnœa compels the patient to sit bolt upright in bed, inspiration is loud and whistling. During the spasmodic attacks of coughing, the patient struggles for breath, with anguish depicted on every feature. In many cases weakened by the already long continued diphtheria in the fauces or other

parts, death ensues by suffocation in the first paroxysm, or in one soon after. Usually the attacks passes off after vomiting of mucous, which gives relief, or after throwing off extensive, fibrinous masses of the exudation," [this relief may be permanent, but many times the pseudo-membrane is renewed with a re-appearance of the previous dyspnœa and death ensues. This occured in one of my patients after throwing off a false membrane that had extended from the larnyx to the second bifurcation of the bronchia.—AUTHOR.]

The disordered respiration of croup and likewise of croupal diphtheria has been divided into three stages, according to the plan of Barthez. The first of which is designated according to the respective seat of the disease, laryngeal or tracheal catarrh, which precedes, sometimes only a few hours, sometimes two or three days, by a light fever the attack itself (dyspnœa, hoarseness, restlessness, etc.). With the beginning of the difficulty of breathing and spasmodic attacks of dyspnœa begin the second stage (stenosis). The cleft of the glottis is contracted during the attack, respiration is performed only by violent exertion of all the respiratory muscles of the neck and breast. The patient can breathe only by sitting erect in bed with head and neck bent backward; which throws the mouth open, the alæ nasi are distended and the larynx moves rapidly up and down, the upper part

of the chest heaves considerably while the lower portion of the sternum and the costal cartilages reveal a depression during inspiration, like a furrow. This is caused by violent contraction of the diaphragm. At the same time the sub-clavicular fossæ and the intercostal spaces sink in. Notwithstanding all this exertion the air passes into the lungs only with great difficulty, making a sawing sound. These noises arising at the larnyx, because of its contraction, may be felt by laying the hand on the front of the throat, as a purring motion. During the paroxysm the face is blue, the skin hot and covered with sweat, and the pulse small. In favorable cases the anxious breathing passes off in from five to fifteen minutes. The respirations become free, the pulse stronger and the patient gradually quieter. These symptoms may decrease after one paroxysm, or several which do not reach the height of the first, and the case may approximate to an ordinary catarrh. This stage leading to recovery, which we will describe farther on, is called the third. The aggravation of all the symptoms which in unfavorable cases ends in death is also called the third stage [there is thereby danger of confusion, AUTHOR]. In this, the paroxysms return at shorter intervals and in a few hours, or a couple of days proves fatal. The dyspnœa and anguish of the patient, the accelerated respiration, (20 to 50 per minute).

continue also although milder during the remission. The face becomes blue and bloated and at last pale and cool. The patient is as if benumbed and stupified, the cough returns at longer intervals. This unfavorable third stage we may call asphyxia, it arises from the imperfect æriation of the blood, which gradually becomes poisoned by carbonic acid gas. In consequence of this defective oxygenation of the blood, and the decreased irritability of the medulla oblongata arising therefrom, the respiration becomes superficial and accelerated. By the violent dilatation of the superior anterior portion of the lungs on inspiration, emphysema arises in the upper lobe and in the lower, which is not expanded at all, and on expiration is closed by abdominal pressure, atelectasis ensues. Hyperæmia and exudation, lobular pneumonia, accompanies this condition.

It is seldom that the exudative inflammation remains limited to the larynx. It usually spreads farther down to the trachea and bronchia. We perceive on auscultation of the larynx and trachea, very rough, loud respiration and whistling, rattling noises which spread over the thorax, and mix with the rhonchi of the bronchia. The voice becomes weaker and weaker, and in severe cases becomes entirely extinguished. The vesicular murmur which is at first increased, afterwards becomes obscured by the laryngeal and tracheal rales. In the

incipient lobular pneumonic infiltration, the vesicular murmur becomes weakened in places and finally extinguished. It is rarely that this infiltration or the atelectasis, becomes so extensive as to be revealed by bronchial respiration and dullness on percussion.

The objective and subjective symptoms manifest great difference in diphtheritic affection of the respiratory tract according to the age and constitution of the patient. While we see in small children the entire complex of symptoms of croup, whistling and long drawn inspiration, cyanoses, tormenting anguish, and constant restlessness all appearing in paryxosms, suffocation and death; in adults, on the other hand, these symptoms sometimes fail entirely and it is only by autopsy, that we find extensive croupal membranes in the larynx, trachea and bronchia. In an assistant of Dr. Wagner, who died on the fourth day of the disease without manifesting any corresponding symptoms, there were found besides a severe diphtheria in the fauces an extensive pseudo-membrane reaching down the respiratory tract to the fourth order of bronchia. A man forty-nine years of age had a hard cough, accompanied by expectoration of mucous, and hoarse voice, but up to his sudden death, no difficulty of respiration was observed. He breathed somewhat weaker and quicker but when asked to respire deeply, said that he could do it

easily, and his thorax moved uniformly, although somewhat less than normal. The pseudo-membrane appeared on the tonsils and seemed to extend downwards and was accompanied by great difficulty of swallowing. He had no fever, in the evening his pulse was only sixty-four. The exudation extended from the fauces, both upwards and downwards. He passed only scanty, dark colored urine which contained no albumen till the disease was well advanced. Examination of the thorax showed that he breathed more quickly, vesicular murmur increased, voice thick and weak. The cough brought up some muco-purulent expectoration. On the night he died he said that he breathed easily, and the thorax moved deeply and slowly. The autopsy revealed an exudation in the larynx, trachea, and bronchia, and still downwards to the bronchia of the second order. This pseudo-membrane was thick and coherent. Under the microscope it appeared to be composed of fibrinous masses, with numerous pus corpuscles. On the under-lying mucous membrane there was newly formed cylinder epithelium. On the mucous membrane lay single fibres and shreds of the destroyed muscles of the fauces, also a few bacteria were found. Both lungs were fully distended with air, and richly filled with blood. In the right and especially in the middle and lower lobes were numerous infiltrations

from the size of a pea to that of a hazel nut, of a brownish red color and on section protruded from the surface, and did not contain air. Some pulmonary œdema; the same conditions were found in the left, but the spots were not as numerous as in the right. The lungs floated in water. Under the microscope they showed numerous blood corpuscles, bacteria, and isolated fragments of the latter. There was a large fibrinous blood clot in the right ventricle. The microscope revealed on examination of the heart muscles incipient cloudiness of the transverse fibres. The mucous membranes of the stomach showed in its entire extent reddened ecchymoses. The spleen was not enlarged. The kidneys swollen, full of blood, and in the uriniferous tubes fibrinous cylinders were discovered.

A case also ended unfavorably in which the symptoms of the respiratory organs were less clearly marked. The exudation extended steadily upwards and downwards with constant difficulty of breathing, profuse secretion of mucous and saliva and considerable swelling of the cervical glands. The febrile movements and the thirst increased at the same time. The temperature reached 102 and upwards, the pulse 130, and even more. It finally became soft and intermitting and the skin cool. Blue color of the lips and cheeks, and rattling breathing heralded the approaching end. The

consciousness remained unimpaired for the most part, and the muscular powers failed only at the very last moment. In such severe cases the examination of the urine frequently reveals albumen.

In these cases with a limited exudation in the throat, after its rapid loosening a quick decrease of the violence of the respiratory symptoms was seen. In light cases there was present at the beginning only slight cough, and some hoarseness, on auscultation there was discernable only increased vesicular murmur. There were many times, several days before the above mentioned symptoms arising from the exudation in the larynx and trachea ceased. The symptoms increased at night, but not to the extent of dyspnœa. If the patient was disturbed by restlessness and anxiety after, sometimes these passed away. Usually after pieces of pseudo-membrane were coughed up, or after vomiting, the symptoms of laryngeal stenosis passed away gradually. The whistling inspiration and crowing cough, disappeared by degrees, or only occurred at night. Frequently rales and increased vesicular murmur, were audible for some time longer. The voice retained its hoarseness for a period. The more rarely returning cough comes only in the morning and is looser, the expectoration is thick, yellowish green, and purulent. The respiration becomes slower and deeper. Generally with

decrease of the local symptoms an equal abatement of the febrile movement is observed. The temperature goes down to 98 or 99, the pulse to 100, 90, or even to 80 per minute. Most frequently in such a decrease of the fever a general sweat occurs in the night, or morning. The urine deposits a reddish sediment, and becomes more profuse and paler. Albumen, as a rule, is not found in these light cases. As the sleep becomes quiet and less disturbed by cough, the appetite and strength returns. Yet, always when the respiratory tract was invaded, the paleness and emaciation continued longer, three or four weeks, than in simple diphtheria. Frequently obstinate hoarseness and swelling of the cervical glands in which we even saw abscesses form remain. And still later paralysis appeared in several cases.

The changes in the larynx and trachea produced by the inflammation and exudation, the swelling of the mucous membrane and the deposits therein, which may be discovered in their full extent, by laryngyscopic examination produced the following characteristic symptoms of croupous diphtheria; hoarseness, aphonia, dry barking cough, whistling inspiration and dyspnœa. Death occurs from spasm of the glottis, or by mechanical obstruction of the respiratory tract by membranes and secretions. A fatal issue may even arise by sudden

unexpected suffocation in consequence of loosening of the pseudo-membrane causing obstruction of the trachea as was observed by Dr. Loewenhardt in a girl twenty-two years old. Insufficient decarbonization of the blood, caused by the emphysema and non-entrance of the blood into those portions of the lungs inaccessable to air, and hyperæmia of the atelectic, impenetrable parts is the cause of an unfavorable result. Death may ensue after the difficulty of breathing has been lessened, from the nervous system in consequence of the disturbed nutrition of certain portions of the brain. Convulsions, or a gradually increasing condition of adynamia and torpor are indications of this disturbed innervation. In this way especially, adults die in whom the disease has spread over the respiratory tract. A fatal result may be caused by pneumonia which occurs in the lobular as well as in the lobar form, usually with exudation at the same time into the bronchia. Wagner saw however, in diptheritic patients several who recovered and two fatal cases of pneumonia in the lobes without the existence of any croupal exudation in the respiratory organs. Œdema of the lungs and more rarely, of the glottis, may also be the the cause of death. Dr. Wertheimer has called attention to collateral œdema of the sub-mucous tissues around the larynx and even of its interior, which accompanied septic diphtheria of the fauces whose

symptoms had the most deceptive similarity to the croupal stenosis of the larynx. In every such case of œdema, there is also aphonia, croupous cough, as well as all the symptoms of contraction of the larynx, stridulous inspiration, the anguish of suffocation, swelling of the neck, red, and even dark blue face. This œdema of the glottis arises more especially in the course of aphthæ of the fauces, in which, in deeply extended necrosis of the tissues, the swelling of the cervical glands and the peri-glandular structures, quickly reaches a considerable extent.

Emphysema may arise in a diptheritic affection of the respiratory tract in consequence of the obstruction to breathing, and it may even extend to the subcutaneous cellular tissues of the neck and breast. Cases of subcutaneous emphysema after diphtheria have been observed by Drs. Sachse and Gueterbock, Virchow agreed with the former in attributing its origin to the root of the lungs. At first interstial emphysema of the lungs arises owing to rupture of the vesicles, the air follows the course of the bronchia through the loose cellular tissues into the mediastinum and from there under the sternum into the subcutaneous cellular tissues. Dr. Gueterbock who also agreed with Virchow regarding the origin of this condition, thinks that it was originally subpleural-inter-lobular, and that it afterwards followed the medi-

astinum along the bronchia to the cellular tissues of the neck and breast. He has shown that in his experience of eleven cases it more rarely complicated those cases in which tracheotomy was not performed, but that it was much more dangerous in them than in those operated upon. None of the four cases in which it occurred in those not tracheotomized recovered.

MALIGNANT FORM.

Diphtheria simplex and laryngeal, are attended by an adynamic type of fever, while the fever of the malignant form is septic in character. The difference between this form of the disease and the simple, is one of degree. They mutually re-produce each other; for instance, a person has been brought in contact with the worst form of the disease, he becomes infected but it may be only the simple variety, owing to surrounding and constitutional conditions. The opposite of this may occur. Some epidemics show a preponderance of the septic type while in others it is almost unknown. Telluric influences play an important role in thus determining the severity, or the mildness, of these cases. Under good Homœopathic treatment there will be but few cases which, taken in time will reach this dangerous intensity. But fully developed cases call for the most careful prescribing, as the powers of nature un-

aided will in the majority of cases be unequal to the task. These are the cases above all others, in which Allopathic expedients must be utterly rejected. There is but one thing that offers a fair chance of rescuing the patient, *i. e.* THE indicated remedy in the minimal dose. No alternation must be permitted. If one of these remedies is the indicated one and it should not be prescribed first, the only chance for cure has been allowed to pass, and even the right remedy should it be given first, its action in all probabilty would be seriously interfered with, and perhaps destroyed by the other one. Nor are crude doses permissable for the vital powers are too weak to re-act under the oppression of large doses, even if they are of the indicated remedy. Cooly and deliberately select the remedy, give it in not too large a dose, and do not change until sufficient time has elapsed to show that it is not wrong curing, unless you have learned of symptoms which clearly indicate another remedy. Pardon this digression, but I cannot impress too forcibly on my readers, the necessity of great care in these almost certainly fatal cases.

Diphtheria maligna usually appears at first like the simple form. A slight aching in the head and soreness of the throat, general malaise, chilliness and fever; but often in from twenty-four to seventy-two hours these symptoms become intense, pulse 120 or more, tempera-

ture in the axilla 104 and upwards. Respiration rapid, the local subjective symptoms usually do not manifest violence, pains in fact may be nearly or entirely absent while the objective ones are making rapid and alarming progress. In other cases there are violent pains in the throat, neck and head. Or this form may arise at any stage out of the mild form from imprudence, heroic treatment or without any discoverable cause.

As in the other forms the exudation appears on the tonsils, in the shape of small isolated, grayish-white patches, these increase in size and thickness so that they soon coalesce. Usually the false membrane extends into the hard and soft palates and downwards, on to the posterior wall of the pharynx, towards the glottis. Some times a thinner deposit makes its appearance after the other on the uvula, root of the tongue, buccal mucous membrane, or gums; this is generally soon thrown off, while the first obstinately continues, or even increases while at the same time it penetrates deeper into the tissues. This rapid spread and burrowing is characteristic of these malignant cases.

In the rapid spreading of the exudation in this form of the disease a change occurs in the appearance of the throat. The neighboring mucous membrane becomes intensely red, livid, swollen, and uneven. The exudation itself is elevated considerably above the surrounding

surfaces. The color of the pseudo-membrane changes to a dirty gray, brownish or blackish, owing to infiltration with blood. The false membrane becomes loose and soft so that it breaks down into a grayish brown pappy mass, which falls off, or only adheres in places, so that it becomes ragged. In rare cases the mucous membrane of the fauces, and even, the muscles of the throat becomes gangrenous, so that ulcers appear on the tonsils, uvula, and posterior wall of the pharynx. The bottom of the ulcers and their borders present various colors. Frequently hæmorrhages occur which are manifested by the dark color of the pseudo-membrane, or as dark red ecchymoses, from the size of millet to flax seed, in the throat and buccal cavity. The saliva also shows admixture of blood, which is increased in quantity and altered in quality. Adults must therefore spit constantly and are thereby disturbed in sleep, while in children it flows out of the mouth and by its acrid properties excoriates the face and chin. These excoriations may becomes foul looking ulcers. The saliva thus mixed with the broken down exudation is brown and very fetid, as is also the breath, so that the air of the sick room becomes quite disagreable, in spite of the utmost care. Great pains should be exercised, by ventilation, cleanliness, and even disinfection, to control this, as it is injurious to the patient and promotes the spread of the disease.

The tongue is foul; great thirst usually; bowels generally regular or constipated; cervical, submaxillary, and parotid glands swollen and painful. The lymphatics become enlarged and the skin unchanged in color.

The countenance and attitude of the patient reveal his sufferings. His face is bloated and relaxed. The redness which accompanied the fever at last gives way to a waxy paleness, with cyanotic lips. His eyes are dull. He lies in a half sitting position; his mouth open and his head thrown backwards to facilitate breathing. His sufferings have deprived him of sleep and thus contributed to exhaust him. The pains at length subside, and he becomes indifferent and lies in a half stupid condition. The temperature falls below the normal; the pulse becomes small, soft and slower, even to 50 per minute. After this condition is reached death may occur, either while entirely quiet or after a slight motion, or excitement. The mind usually remains unclouded to the last. Rarely does delirium or fainting occur. The latter may cause death even after the patient has become convalescent.

Death may even result in from two to six days. These rapidly fatal cases are called by the French "foudraynte." These cases do not show any important lesion but it is evident that the vital powers have been overwhelmed by the morbid process. In some epidemics

many of these cases are met, while in others few or none. They appear with high fever, unquenchable thirst, hæmorrhages, œdema of the glottis and albuminuria, [a striking resemblance to the picture of Arsenic a.]. Other cases of the malignant form continue longer. The characteristic symptoms not developing until the third or fourth day. The exudation loosens, the glandular swellings decrease, yet the patient continues weak and pale, with sinking of the temperature, small irregular pulse and after ten or fourteen days, succumbs to the disease, owing to paralysis of the heart. Generally the autopsy reveals fatty degeneration of the cardiac walls. This variety of the disease is very frequently fatal. When recovery takes place, the exudation ceases to extend and falls off, the fetid ptyalism lessens, the glandular swellings decrease slowly, the temperature rises to the normal or a little above, sleep and appetite return, and therewith the anæmia slowly decreases. In favorable cases the recovery is slow and is frequently interrupted by the relicts of the disease in various organs and by sequelæ, which may continue for months, and even then, may result in death, unless prevented by the indicated remedy. Anæmia very frequently follows malignant diphtheria. It appears in all grades from the slightest paleness and weakness up to the most clearly marked bloodlessness.

It is evidently that it is a result of the blood poisoning that has occurred. It is manifested by great sensitiveness to the cold, coolness of the skin, small rapid pulse, bellows murmur of the heart and large blood vessels. It occurs particularly in those who were before anæmic and in scrofulous children. Fainting, dyspnœa and convulsions may unexpectedly usher in death. A post mortem only shows the marks of a want of blood and perhaps œdema of the lungs. In these patients menstrual derangements and leucorrhœa occur and may continue long after. Dropsy is a sequela of this form of the disease.

In septic cases there is a great tendency to localization of the disease in other organs than those usually affected. Of the greatest importance is the participation of the respiratory organs in the morbid process. While the disease is limited to the throat, a considerable swelling of the latter obstructs inspiration, although not to the extent of dyspnœa, or changes of the normal sounds of the lungs. Occasionally, when the pseudo-membrane extends far down the throat, there will be at long intervals a rough painful cough, with thickness and weakness of the voice showing that the exudation has reached the entrance of the larynx. If it extends farther the symptoms of the croupal form set in which has already been described. The diphtheritic exudation has been

observed in the nose, the conjuctiva, the ears, the stomach, and the sexual organs. Also on wounds, ulcers and even on the sound skin.

It is rare that the disease manifests itself primarily in the nose or the other above mentioned organs. It is by extension of the exudate that they become affected. All of these affections of other organs occur only with the malignant form. When it extends to the nose it frequently spreads over a considerable area; sometimes over both nostrils and the upper arch of the choanæ. The mucous membrane appears swollen and afterwards covered with yellowish, or brownish exudation, or with sanious ichor. The patient complains of tickling and pressure in his nose. The sensation of obstruction causes frequent sneezing and the necessity to violent blowing of the nose disturbs him constantly. Air in its passage through the nostril causes a blowing noise. There soon occurs a flow of thin sero-purulent, and afterwards muco-purulent matter which, when decomposition of the membrane begins, changes to a greenish-brown fetid ichor, which excoriates the nostrils and upper lip and even causes ulcers. Œdema of the eyelids may accompany this form of the disease. Frequently violent epistaxis occurs which, owing to the weakness of the patient may prove fatal.

If the case does not end in death, the exudation in

the nose decreases gradually, but often leaves behind a chronic catarrh. The diphtheritic process may extend deeper than the nasal mucous-membrane, producing ulceration of the submucous tissue, and may even affect the bones and cartilages, and thus cause ozæna of a bad type. In lighter cases the pseudo-membrane loosens and is discharged. Yellowish-green purulent matter continues for a time from the nose but decreases as the swelling of the mucous membrane lessens, and the disagreable fetor gradually disappears.

The morbid process may extend from the nose to other organs. It may spread to the lachrymal duct and cause swelling of its mucous membrane, closure of the canal and thus constant discharge of tears. It sometimes attacks the conjunctiva, more frequently of the inferior lid. The exudation which is at first very thin becomes thicker and may even spread to the surrounding skin of the lids, which become swollen and immovable. This complication is dangerous to the structures of the eye. Jacobi says that frequently the cornea is disorganized by gangrene arising from the pressure of the vessels, or by diphtheritic corneitis within twenty-four hours. Von Graefe describes a diphtheritic conjuctivitis. He says that it is characterized by great heat, violent pain and considerable swelling. The conjunctiva becomes penetrated by a dense fibrinous

exudate which leads to softening and finally to shrivelling of the eye. He considered the local suffering as the expression of a general disease which is accompanied by violent fever, heat of the head and depression, and which attacks those already sick more frequently than the healthy. Of forty children affected five died from croup, some from pneumonia and others from hydrocephalus. Frequently there was at the same time diphtheritic inflammation of the skin around the nostrils, angles of the mouth and of places which had been blistered. This form is contagious and appears epidemically in the spring and fall. Previously existing inflammation of the eyes predisposed to the disease which attacks children from two to eight years old, although it did not spare adults. Jacobson saw this disease of the eye in the begining of the summer of 1859, at a time when diphtheria of the fauces and larynx, erysipelas and carbuncles prevailed; of those attacked sixty-two in number were previously healthy. Many other epidemics were seen but all showed a relation to the prevailing diphtheria.

Diphtheria also attacks the ears and that too more frequently than the eyes. It is a concomitant of the disease in the fauces. It has many symptoms in common with catarrhal inflammation; pains in the affected ear which are aggravated by swallowing, roaring and ringing,

hardness of hearing. The disease may attack the tympanum and cause perforation, and even extend to the bones forming the auditory canal and thus caries of the bones may ensue.

Diphtheria of the mouth primarily is not frequent. It usually appears as a concomitant of the disease in the throat and nose when it has assumed a septic or gangrenous character. It occurs on the inside of the cheeks, gums, tongue and angles of the mouth. In these localities it is less an exudation than an infiltration of the cellular tissues beneath the mucous membrane. It is more liable to occur where the mouth is already affected, as in follicular stomatitis. It is always dangerous. The œsophagus has been affected in a few cases.

The stomach has been the seat of exudation. Seitz discovered it in two cases on autopsy. The symptoms during life had been, nausea, pains in the epigastrium increased by pressure, eating and drinking, constant vomiting of fetid mucus and sloughs of mucous membrane. Exhaustion followed. The disease has been seen in the intestines. The symptoms are pain in the affected part if it is in the colon or rectum. If the follicles are invaded and ulcerate, the stools are mixed with mucus blood and pus. On the edge of the anus there is sometimes seen a whitish-gray exudate. At first it is in isolated spots, but soon they become confluent and then

form a ring from one to two lines wide. In proportion as the process extends upwards, there will be pain in the anus and spasmodic tenesmus. These cases are usually septic and soon produce exhaustion.

Diphtheritic exudations sometimes appear on the genitals after the disease has been in the throat for a few days with swelling of the labia, usually of a livid color, and bounded by the cuticle. The pseudo-membrane is a whitish-gray and of different thickness, and sometimes spreads up the vagina and even into the uterus. It occurs more frequently in lying-in women. Exudations have even been observed on the glans and prepuce.

Wounds and ulcers quite frequently become diphtheritic and are then accompanied by danger. Jacobi lays it down as a maxim that none but unavoidable surgical opperations should be performed during the prevalence of the disease. Several cases have been observed where diphtheria has set in after circumcision. Blisters and leech bites have become diphtheritic, but that is of no interest to my readers. And even the sound skin has been attacked. Seitz gives the following description:

"Red spots appear on the skin with burning or itching pains. These spots are round, elliptical, or irregular and larger or smaller. In the center of the spots there arises white, or yellow elevations compar-

able to the wheals of urticaria, or vesicles like rupia or pemphigus. These are followed by yellowish, brownish exudations which may become dark from hæmorrhages, they dry into thick or brownish crusts which when thrown off leave superficial ulcers. The red borders become paler as the ulcers heal and leave brown spots, which may remain visible for some time."

Of great importance are the changes which occur in the urinary secretion particularly in the more severe forms. The urine is usually darker from the beginning while a sediment of the urates may be precipitated. The quantity is decreased in proportion to the intensity of the fever; as this abates the secretion approximates the normal. The specific gravity averages 1016, with moderate fever, but if this is violent it reaches 1022 and even 1028. The urates are increased. I have already spoken of albumen in the urine and its significance.

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CHAPTER IV.

PATHOLOGY.

Jenner, professor of the medical clinic of London University College says: "Diphtheria is more closely related to typhoid fever than to any other acute, specific disease in that the patient may die from the general disease, or the local infection, perforation. So in diphtheria he may die, owing to the character of the fever, or because of the extension of the local disease to the larnyx, trachea, or bronchia."

That this disease is a general and not a local one seems to be very plain, notwithstanding the therapeutics of many professing Homœopaths indicate that they consider it a local one. The leading Old School authorities now acknowledge that it is constitutional, although for a long time their treatment was based on the assumption that the membrane was *the disease* and that it must be removed by gargles, cauterizations, etc., till their unfortunate patients were tortured out of existence. Jacobi says: "General symptoms as pains in

the limbs, depression, chilliness, fever and convulsions may continue for hours and days before the appearance of local ones. And general phenomena as toxæmia, adynamia and frequently albuminuria are more frequent and earlier occurrences than can be explained by the presence of fever alone, although it is geneally present. Further the frequently appearing consecutive paralysis indicates a previous general affection of the entire organism." Gerhart's Handbuch der Kinderkrankheiten, Band II, S. 711.

It has been urged, that granting that many cases of diphtheria are constitutional, yet those, in which the disease begins in recent wounds, or in other places which have come into direct contact with the pseudo-membrane and are destitute of premonitory symptoms, are local. Let us investigate, vaccination is an exact analogue of these cases. The vaccine virus is introduced into the system by scarifying the skin. The scratches heal and after several days of incubation a pustule forms at the point of operation. This may be preceded or accompanied by malaise, chilliness, etc., but does any one assert that the pustule is a local disease? No! for the immunity of the patient from the variola demonstrates that the entire system has been permeated by the virus. In these so-called local cases of diphtheria, exactly as in vaccination, the diphtheritic virus is taken

into the circulation at a certain point, it may be the fauces, in inspiration, a wound or any other part, and there it first appears and the other parts of the system show very soon that they too feel the disease. During the interval between the absorption of the virus and its manifestations at the point of introduction, several days have elapsed during which the morbid process has been going on unperceived. Now if the vaccine disease is a general one, the diphtheria arising from the local contact is one also. In allcases, whether the local or general phenomena appear first, there is a constitutional disease *and it must be treated as such.*

The first changes in the mucous membrane which takes place are those of a catarrhal inflammation of the throat, the mucous membrane of which becomes red, swollen, and the secretions changed in quantity and quality. In a few hours the characteristic pseudo-membrane appears, usually in the fauces. It is at first of a white or yellowish color, and in spots, which, increasing in size, soon coalesce and become coherent. The false membrane may afterwards become darker from extravasation of blood. The exudation usually begins on one or both tonsils and may reach the gums, soft palate, posterior wall of pharynx and even extend downwards into the larynx, trachea and even into the bronchia forming the dreadful croupal or laryngeal form

of the disease. As the membrane becomes older it usually gets darker and softer, so that it falls in pieces or becomes a pappy solution. The exudation is at first composed of fibrin, pus-corpuscles, mucus, altered epithelium and bacteria. The fibrin predominating where the membrane extends to the air passages so that Oertel and others think that it is only in the croupal variety that fibrin is present. The pus-corpuscles are found in increasing numbers, the longer the membrane has existed, and thus contributes to its loosening and falling off by accumulating between the mucous membrane and the exudation.

The solubility of the pseudo-membrane is of some importance, Kuchenmeister to determine what agents were the most useful in dissolving it, performed the following experiments: He took two pieces of the false membrane of a girl who had died of laryngeal diphtheria and put them into the respective liquids. In Aqua calcis, one part of lime to thirty of water, the exudation dissolved completely in ten to fifteen minutes and in a less time became so soft that it fell to pieces by moderate shaking. In strong vinegar mixed with water and honey, it swelled up, and became transparent and remained unchanged for days. In a concentrated solution of Borax, in liquor of Potassa, in a concentrated solution of acetate of Soda, and in a solution of chlorate of Potash,

it swelled a little but did not dissolve at all. Pure Muriatic acid one part, honey three, and one part of the acid to nine of water, and still weaker dilutions made the false membrane darker and denser. Liquor Kali-causticum pure, and diluted one part to thirty, and to sixty, only swelled the exudation but nothing more. Dilute Nitric acid, and Copaiba dissolved in ether had no effect. Argentum nitricum one part to six of water only solidified it. Oil of turpentine pure, and diluted one part to six of spirits, and Creasote water preserved it. The lime water also proved itself useful in two mild cases and one severe one with exudation both before and behind the palate, used as a gargle. Seitz also found that alcohol preserved the membrane.* Chromic acid, Iodine and Bromine had the same effect. Tannic acid causes the membrane to shrink slightly, Lactic acid still more, Kali chloricum dissolved it but only slowly, Sulphuric acid and Nitric acid softened it and caused it to disintegrate. Nitrate of silver did not dissolve but only contracted it, Ferrum chloratum had no direct effect on it. We thus perceive that many of the agents which have been so frequently employed to dissolve the membrane by gargles and penciling failed in accomplishing that purpose when tested fairly. I will attempt to show that it is fortun-

*I once preserved a complete membranous cast of the trachea for years in alcohol. AUTHOR.

ate that all attempts to do so failed, unless it be where the exudation has reached the respiratory tract, and in that case the membrane is inaccessable to the ordinary modes of reaching it. The pseudo-membrane extends to the larnyx and trachea it generally becomes thinner and more delicate, although it sometimes lines the air cells, completely filling them.

Reamer found in seventeen post-mortem examinations, the lungs hyperæmic eight times, twice pneumonia and three cases of embolic infarction, and accompanying these conditions, twelve times emphysema, seven times atelectasis and six times œdema of the lungs. Subpleural ecchymosis was discovered seven times, pericardial four times. Seitz says "We find in the lungs of those who die of diphtheria extravasations of blood of different sizes, particularly on the pleura and the surface of the lungs. These were usually only the size of peas, but occasionally reached that of hen eggs. Pneumonic hepatizations even, may be found. The portions of the lungs thus affected appear darker, more dense, richer in blood and poorer in air. On section such places sometimes appear yellow in the centre, they are more easily torn and sink in water. Microscopic examination reveals in these spots dilatation of the capillaries by being crowded with blood corpuscles, outside of the capillaries are other blood disks in abundance and diph-

theritic infiltration. In the alveola and the inter-lobular spaces pus-corpuscles, bacteria and the like are also discovered.

The heart is often the seat of pathological changes Extravasations of blood are frequently found in the pericardia and also in the heart muscle. The walls of the heart are after a long continuance of the disease and particularly where the patient has died from cardiac paralysis, pale, soft, and easily broken down, from fatty degeneration. Under the microscope this degeneration of the fibres is found more or less clearly marked. The blood is found in the heart and the other vessels, usually fluid, brownish, or bluish red, and stains the fingers black. Fibrinous clots sometimes of considerable size are found in the ventricles, especially where the respira tory tract has been effected.

The alimentary canal reveals besides the exudation in the fauces, other deposits, but only rarely in the œsophagus, stomach and rectum. These changes are the same as occur in other mucous membranes.

The kidneys are very frequently affected. During life these changes are discoverable by the presence of albumen and tube casts in the urine. In cases which are quickly fatal there is found swelling, hyperæmia and sometimes hæmorrhagic infarction. In those which have continued longer and in the septic form the swel-

ling is more considerable, the cortical and medulary portions darker red. The Malpigian bodies are displaced by small blood extravsations. The lining of the uriniferous tubule is found by the microscope to be swollen and granularly clouded, broken down, loosened and rolled up into cylinders, which are found in the urine. Occasionally hyaline coagula are found in the tubules, which contain also certain blood corpuscles which have exuded through the Malpigian bodies. In consequence of the bleeding from the Malpigian tufts the capsules are filled with blood. Bacteria are found in the tubules and tufts, fatty degeneration of the kidneys is often present.

Seitz gives the following resume of the pathology of diphtheria: "We perceive in diphtheria the effect of a virus, the nature of which is unknown to us which is called, owing to its propensity of being communicated from those sick of this disease to the healthy, contagious matter.

"Its effects appear in a class of changes which are common to all cases, and which follow in a definite order, both in the functions and aggregate condition of the system as well in the sick bed, as on the dissecting table.

"The deleterious effects of the contagious matter on the organism, is usually first expressed by malaise and

locally on the mucous membrane of the fauces. It is possible that the existing unspecific bacteria which are present in health may play a part. However, the morbid effects are often seen first on the nasal and laryngeal mucous membrane and even on the skin.

"The disease extends from the mucous membrane and skin where the infection takes place through the lymph and blood vessels, and thus into the entire system. As an expression of this general disease which has thus arisen, the fever appears usually before the diphtheritic, and croupous deposits are seen on the mucous membranes.

"Diphtheria as well as croupous pseudo-membrane is the result of a transformation of the epithelium which finally leads to its disintegration and breaking down. The former process is the effect of granular growths in the mucous membranes, and is accompanied by necrosis of the tissues. This necrosis arises from the compression of the vessels by the infiltration which obstructs the circulation and thereby nutrition of the affected parts. The diphtheria pseudo-membrane is really not an exudation but only the transformed epithelium and the sloughing sub-epithelial mucous-membranous tissues, while in croup the false membrane is composed of fibrin and pus corpuscles which are secreted by the epithelium which covers the mucous membranes.

"The secretion which is poured out by the muciparous glands between the pseudo, and the mucous membranes and the fatty granular breaking down of the cells enclosed in the fibrinous layers cause a dissolving and loosening of the deposit.

"The diphtheritic slough arising from the softening and loosening of the decomposed mucous membrane tissues is separated from the parts which remain healthy by the pus produced by the reactive inflammation. The slough is lifted off as it were by the accumulated secretion and leaves an ulcer which soon heals.

"Septicæmia with fatal results may arise from the local, gangrenous ulceration, and the extensive, necrotic deeply penetrating softening of the mucous membrane. It may also originate where the local diphtheritic phenomena were only slightly developed, from the blood poisoning growing out of the primary infection.

"Extravasation of blood and granular infiltration, in the cadaver in any organs of the body indicate septicæmia. The presence of these diphtheritic infiltrations in thenerves produce the paralysis so characteristic of this disease.

"The changes in the blood and disturbed nutrition is indicated by the anæmia which sets in after even mild cases, and produces scrofula in children, and premature marasmus in older patients. Fatty degeneration which

is unmistakably stamped in the cadaver in the various organs; liver, kidneys, muscles, but particularly in the heart gives rise to fainting and sudden death."

CHAPTER V.

SEQUELÆ.

This disease leaves almost as terrible sequelæ as scarlatina. But under good Homœopathic treatment there will be few or no sequelæ in either disease. They never follow a *cured* case of diphtheria. They will follow in those patients in whom the medical treatment was either useless or hurtful, but never when there is a cure. This is one of the evidences that the case has been cured, that there is an absence of those complaints that really are part of the original disease, or are the effect of aroused latent taint, call it psora, scrofula, or any name. But as we ~~will~~ shall have to treat patients from the hands of the Old School and also when in our own treatment we have failed to find *the* remedy, I will delineate these affections.

Neuroses are the most frequent of the sequelæ of diphtheria, and are divided into different varieties. Anæsthesia, hyperæsthesia, paralysis, and hyperkinesis. Cases of the first mentioned are usually more or less relat-

ed to paralysis. When uncomplicated by the latter the patient complains of a feeling of numbness and furriness of the affected parts. These symptoms usually appear in the extremities, but may spread over the trunk. Touch, tickling, pricking, etc., are not perceived. The fingers feel on touching any object as if there was velvet, leather, or wood, between it and them. His feet feel as if he was standing on fur or felt. The sense of touch is so much impaired that he cannot distinguish small objects with his hands and he does not feel the ground under him. He has to watch where he puts his feet, and he must direct his attention to the motion of his muscles. Prickling, formication and going to sleep of different parts annoy him.

Hyperæsthesia is not frequent. But we occasionally meet convalescents who complain of great sensitiveness to cold, noise, light, etc. True neuralgias of different parts are sometimes the result of this disease. Spasmodic action is comparatively rare.

The sequela that is by far the most frequent after diphtheria is paralysis. Its frequency varies in different epidemics. In some it was uniformly present while in others it was nearly unknown. It does not depend on the severity of the disease. In fact, Jacobi says that it preferred not the most severe but the mildest cases. Much difference of opinion exists as to the cause. One

attributes it to toxæmia, another to the action of the diphtheritic virus on the nerves, and so on *ad infinitum.* Jacobi whose views are more rational than those of all other authors on this point, says: "We may assert that diphtheritic paralysis does not rest on the same basis in every case. Many may be considered identical with these which arise after typhus or any violent inflammation of the mucous-membranous system. In some it is certain that the paralysis progresses from the part first attacked, in others it follows or accompanies granular, fatty, or waxy degeneration of the muscular fibres or capillary hæmorrhage. In some the affection decidedly arises in the nerve centres for Buhl has discovered hæmorrhages in the spinal ganglia, and in the gray substance of the spinal cord. In others it may be ascribed to the tendency to nervous disorders and hæmorrhages, in all pyperæmia, and particularly when the vascular walls slowly recover, or where convalescence progresses gradually and the heart is compelled to violent exertion. Frequently I was inclined to explain most cases of diphtheritic paralysis, in this way, for I thought that during recovery from sickness when the patient imagines himself capable of any exertion, the insufficient nutrition of the vascular walls was the cause of bleeding, or serous exudation. In a great many cases of diphtheritic paralysis, I do not

hesitate to impute them to the anomalous nutrition of the nerve tissue which was slowly poisoned without much fever owing to the imperfectly performed oxydation of the blood, even although the cases showed but little or no membrane in the fauces. Trousseau and Maingault had already ascribed diphtheritic paralysis to a general blood poisoning. This view is so much the more correct in these cases in which the process begins slowly and manifests no prominent symptoms. The more fever exists, the greater may be the sudden accumulation of the virus in the blood, so much the greater and quicker is probably the elimination of it. This will best explain the fact that very often the diphtheritic paralysis *follows not the severest but the mildest cases of diphtheria. Only when the symptoms in the throat are clearly marked can we consider, with any certainty that the fauces have formed the starting point of the paralysis.* In these cases the local paralysis depends on a direct affection of the nerves or from pressure on them by the products of the inflammation. I have observed that as a rule, that in these cases a general diphtheritic paralysis does not ensue. On the contrary, paralysis of the superior and interior laryngeal nerves, the spinal nerves of the head and those of the extremities occurs, singly or combined after mild cases. The fact that the paralyzed nerves do not necessarily belong to the same

neighborhood indicates that the circulation of the blood is the medium for the dissemination of the virus. I hold that this explanation is much more simple and rational than that it is caused by bacteria, which penetrate the parts affected by the circulation through the tissues and are finally deposited by the blood in the muscles and nerves." Gerhartd's Handbuch der Kinderkrankheiten, Vol. II, S., 734.

Paralysis is usually not discovered till the first or second week of convalescence or it may not occur till the thirtieth or fortieth day. Its onset is gradual, as if an entire muscle was not at first affected but only single fibres, till it failed to respond to the will. The throat is usually the part first affected, and more frequently than any other. The most clearly marked symptom is an affection of the voice and difficulty of expectorating. Nasal tones are usually the first thing to attract attention, the voice is weak and uncertain, even to complete aphonia, particularly after exerting the vocal organs. The patient is unable to pronounce words and sounds clearly. Disordered deglutition follows. He finds it difficult to swallow, particularly fluids; food and drink are regurgitated and thrown out through the nose. He is compelled to eat and drink very slowly. Deglutition may become so difficult that swallowing is impossible, and the patient must be fed by an œsophageal tube. He

is also unable to expectorate, and if the case is complicated with bronchitis or pneumonia, life is thereby much endangered. The uvula and soft palate hang relaxed, and if only one side is affected the former inclines towards the healthy side. Anasthæsia of the fauces may also be present.

Next in frequency to paralysis of the muscles of the palate, and often complicating it, is disturbances of vision, owing to paralysis of the muscles of accommodation. The first indication perceived is difficulty of seeing small objects, such as reading small print. He must hold the object farther away than formerly, the eyes soon tire. Diplopia and strabismus may attend this visual complaint.

The ears may also be affected, symptoms of irritation as noises and sounds in the ears; and hardness of hearing and even deafness may occur.

Paralysis of the extremities are next in frequency, both upper and lower; more frequently the latter and sometimes these first and the superior afterwards. The paralysis is gradual in its appearance, uncertainty of movement, weakness and finally complete paralysis may be the result.

The trunk may be affected. The muscles of the neck become weakened, which is readily observed by the difficulty which the patient experiences in holdiug up

his head. It falls from side to side. When the muscles of the body are affected he has difficulty in turning in bed. If the respiratory muscles are attacked, breathing becomes affected and it may increase till death ensues therefrom. The sphincters are sometimes, though rarely, affected.

Diphtheritic neuroses usually end in recovery. Neuralgia, spasms, anæsthesia and nearly all cases of paralysis recover. The paralytic symptoms usually continue six or eight weeks, but may last six months, if it is progressive in its character and then recover. The muscles first attacked get well first. Of the thirty cases observed by Seitz, twenty-eight were restored. When fatal it is usually owing to an affection of the respiratory muscles. Death may arise from difficulty of swallowing, pneumonia, foreign bodies finding there way into the lungs and by paralysis of the heart.

CHAPTER VI.

DIAGNOSIS.

The diagnosis of diphtheria is not always free from difficulty, true the great proportion of cases are easily recognized, but others demand a careful consideration of the general and special features, including history, prevailing epidemics and careful physical examination and chemical analysis of the urine. While the pseudo-membrane is more nearly pathognomonic than aught else yet its absence does not always exclude diphtheria. For in some light catarrhal cases the exudation is scarcely, if it all, observable, and when the deposit takes place on other than the faucial mucous-membrane, we may long remain in ignorance of its existence; for instance when the nasal passages are alone invaded. In these cases the false membrane may not be visible to any ordinary examination of the nostrils. And it is folly to talk of using the rhinoscope in infants and children. I grant that the symptoms will call attention in that direction, and we may have good reason to suspect that

a false membrane is in the nasal cavity. Fortunately for our diagnosis, the lymphatic glands are nearly always swollen in such cases, which will go far to confirm our suspicions that diphtheria is present. And if the exudation begins in the trachea another difficulty exists. Here the dyspnœa may be caused by diphtheritic membranes, but it may be from true croup, and also from œdema of the glottis. If aphonia and difficult inspiration and expiration are present simultaneously, it is certain that there is an obstruction from false membranes. *If the aphonia is only developed later and at the very last, and only the inspiration is obstructed while the expiration remains tolerably easy, there is an œdematous swelling of the sub-mucous tissues of the aryepiglotticus left with the parts adjacent to the vocal chords.* This occurence is not very infrequent, while a general œdema of the glottis is in diphtheria one of the rarest events. Sometimes this local œdema may be clearly felt with the finger. When the diphtheritic exudation first takes place in the trachea which it does in rare cases, and then works upwards, we will find it difficult to diagnose between this and croup, but not impossible. The fetor of the breath which accompanies diphtheria should here be remembered. It is not by any few symptoms that we can differentiate them, but only by a careful comparison of the history and course of the case can

we decide. These special symptoms have already been mentioned.

It is necessary to enter somewhat minutely into a differential diagnosis between diphtheria and scarlatina. The implication of the larynx so common in diphtheria is a very rare occurence in scarlatina. In diphtheria, the exanthemata is usually absent, if present it is not followed by desquamation as in scarlatina. In the latter the eruption appears first on the hips and extremities and remains out five or six days, in the former it first shows itself on the breast, neck, and abdomen, and continues only two or three days, and disappears without being followed by any aggravation such as occurs when the scarlatinal eruption disappears prematurely. The febrile symptoms are more clearly marked in scarlet fever and soon reach their maximum, while in diphtheria the rise of pulse and temperature is slow. Albumen may be present in the urine at the inception of diphtheria while in scarlatina it does not appear till the second week.

I choose this place to mention a combination of the two diseases in one patient. "Diphtheria is so often a complication of scarlatinous angina that many authors have assumed that a necessary relation exists between both diseases, and that the diphtheritic inflammation of the throat is a direct effect of the contagion of scarlatina.

The fact that scarlatinous diphtheria is not distinguished by any peculiarity of either form, seat, or course from simple diphtheria, proves the incorrectness of this view; like the latter, it may be confined merely to the throat, and to parts which are primarily not affected in scarlatina, or may spread to the nose and larynx, or lastly, may affect the latter alone, as also the contiguous portions of the respiratory mucous membrane; it may extend from the throat to the organs of respiration, or from these to the throat; it may remain mild and superficial, or spread in depth and cause ulcerations, perforations of the soft palate, loss of the uvula, destruction of the palatine arches, etc. Diphtheria may be a complication of the mildest, as well as of the severest throat affections; in every case it naturally observes the characteristic appearance, and augments the intensity and danger of the simple form, partly by the accession of the consequent local symptoms, and partly also by the diphtheritic constitutional infection. It may complicate scarlatina in every stage of the disease; first, in the stage of incubation so that the symptoms of secrlatina and diphtheria appear simultaneously; or the diphtheritic symptoms may precede those of scarlatina, thus causing the error of supposing that only *one* disease is present; or as most frequently occurs, after scarlatina has already existed for several days. The throat

symptoms, suddenly become aggravated, by the occurrence of diphtheria, or it appears immediately after the scarlatinous process has run its course in the skin and throat; or it occurs during the convalescence from scarlatina, with or without complications. In like manner, scarlatina may at any time complicate a diphtheria, though this is a rarer occurrence than the former case." Thomas, Ziemssen, Vol. II, page 217,

CHAPTER VII.

PROGNOSIS.

This depends in a great measure on the treatment. Eminent Allopathic authorities acknowledge their helplessness in the presence of this disease. Seitz, who is probably the best of the Old School writers on diphtheria, says: "Careful observation for many years have taught us that the influence of medical art in this disease is very limited. We know up to this time no remidies which can shorten mild cases, or avert death in severe ones. Experiments carefully carried out, and in sufficient numbers have convinced us that active interference with all the now known remedies [Allopathic] cannot stay the progress of the disease. The *expectant method* therefore as in other epidemic diseases, for example typhoid gives the key-note for the treatment of diphtheria." Croup und Diphtheria, Seitz, 463.

I have translated this passage literally in order that I may not be accused of any injustice to our col-

leagues of the other school. Oertel, another standard authority of the same school, says: "There can be no doubt then, that the unfavorable results which have been attained on all sides by cauterizations, more or less energetically practiced, must put a stop to this procedure even if in its stead we should have to resort to the opposite, the purely expectant and symptomatic treatment." Ziemssen, Vol, I, page 673.

If those among us, who still long for the flesh pots of Egypt, would take pains to inform themselves of the uselessness, nay, of the hurtfulness of the regular treatment in this, and other diseases, we would have less dabbling with Allopathic expedients. Such men as Hering, Lippe, Guernsey, Dunham and others have had the most favorable results. For instance, Professor Lippe informs me that in his cases which had taken no Allopathic, mongrel or domestic treatment his mortality was not above 1 per cent.

But even under the best treatment diphtheria is always a dangerous disease, and one in which a mild case is liable to change to a malignant one by any imprudence or even without any perceptible cause. It clearly resembles scarlatina in this particular. Different epidemics show a remarkable variation in the rate of mortality, for instance, in Italy in the year 1873 in a total of 3,319 cases 1,101 proved fatal. In Trezzo-Sull Adda

of twelve attacked eleven died. Dr. Guild reports an epidemic in Rupert, Vt., in 1862, under blood-letting and calomel the mortality was 90 per cent., while Dr. John Bridger reports that from 1862 till 1864 he treated 3,000 cases in Cottinham, England, with a loss of only seventy-five, and Dr. Moerath treated in Steinmark, Ger., 130 cases with Rademacher's tincture of Iron with only three deaths. I might quote *ad infinitum* but these will suffice.

The different forms of the disease have a great weight in predicting the final result. In diphtheria simplex there is under good treatment but one danger, *viz.*, that of its changing into either of the other forms, and this may happen without any assignable cause. The pseudo-membrane may extend downwards into the respiratory tract which is always ominous, for the mortality is terrible. Jacobi says that in severe epidemics the mortality of this form reaches 95 per cent. It may also assume the septic type which is equally dangerous.

Age is of primary importance, as the younger the child the more likely to prove fatal. The membrane is more liable to extend downwards in infancy, and this complication is more to be feared in the infant. The debilitated, the scrofulous, the poorly nourished, and the intemperate all have less resisting power than the previously healthy, and the septic form is more liable

to occur. Febrile symptoms are of only inferior value in predicting the result. Many cases with but slight fever proving fatal while those with a high fever have recovered. A sudden increase of the pulse and temperature indicates that there is an extension of the membrane, or that inflammation has arisen in the lungs or some other organ. Collapse—sudden sinking of the temperature, below the normal, slow, weak pulse, etc. is ominous.

Complications increase the danger. Bronchitis and pneumonia are not unfrequently present. Albuminuria particularly late in the case, is indicative of evil. Glandular swellings are to be feared, especially if large. Hæmorrhages, particularly when the pseudo-membrane extends to the nasal passages, weaken the patient and thereby increase the danger.

In addition to the different variations in various epidemics, the period when attacked is not unimportant as the first cases are as a rule the most formidable. An epidemic usually begins with great violence and gradually grows milder until the end is reached.

The extent of the mucous membrane involved is to be considered. As a general rule the more circumscribed the exudation the less the danger. Extensions to other points than the fauces are ominous, that to the respiratory tract has already been mentioned; to

the nose is almost certainly fatal, to wounds, ulcers, genital organs and alimentary canal all multiply the danger. Thick dark membranes, if the case is not of the septic form are not unfavorable.

CHAPTER VII.

PROPHYLAXIS.

As we have already shown, cleanliness in the sick room lessens the liability of others being infected, although it does not completely remove the danger. As to disinfectants, the history of the yellow fever epidemic of 1878 has again shown their worthlessness and almost proved their hurtfulness. And so has the history of every epidemic of whatever disease. Yet as drowning men grasp at straws, so do the profession and people turn to the same thing or to a new one and always with the same result, *viz.*, utter disappointment. There is only one direction, from which we may expect the aid of science in this field, ozone. It is owing to the lack of this, nature's own disinfectant, that diphtheria and other putrid diseases arise. If we ever learn to restore this agent to the atmosphere when absent we will have guarded against the entire class of diseases which have always carried off mankind by epidemics. Thus far no one has invented a favorable plan of ozonizing the

general atmosphere, nor that of the sick room. Let us hope and work for the accomplishment of so desirable an end.

Public sanitary measures have failed in showing any perceptibly good effect, although they should not therefore be neglected. On the other hand do not let us expect too much, or we will be disappointed.

The most important prophylaxis is the medical. Hahnemann won well earned laurels when he discovered that Belladonna prevented, when used as he directed, the scarlet fever then prevailing. The scarlatina Sydenhami or smooth scarlet fever no longer prevails and, consequently Belladonna is no longer a preventative against this form of scarlatina, because not indicated in the sick. Bœnninghausen says. Die Aphorism des Hippocrates, Buch V., Aph. 1: "Very nearly related to the doctrine of antidotes and to be judged by the same natural laws, are prophylactic remedies which are intended to guard the system in advance against the liability to be infected by a contagious disease. It is known that the most malignant and undoubtedly contagious diseases always spare some persons. And it is the general opinion founded on probability, that they escape because they lack susceptability. Experience has shown that in order to produce this condition artificially, only such remedies avail which

have the power *to cure the dreaded disease*, and which therefore produce a reaction in the organism which is directed against the disease and its influence. Consequently if we are called into a house, where, for example, a certain kind of nervous fever exists, in order to protect the remaining members of the family against the infection, we can only do this by administering the same remedy which has proved the true Homœopathic one in those who are already sick; while all other drugs which are usually administered in nervous fevers are useless. There is in this case no more a *universal prophylactic* than a *universal remedy*. And everything else as the customary fumigations which are used to destroy an utterly unknown contagious matter, belongs to that class which has always failed." In an epidemic of diphtheria or of any other disease, it is therefore incumbent on us to discover *the* remedy corresponding to the genus epidemicus not only thereby to cure the sick but to protect the healthy. When we have searched out the epidemic remedy, we should give it to those exposed. Hahnemann's directions are the best. Give a dose of the appropriate remedy in the 30th potency every six or seven days.

CHAPTER VIII.

THERAPEUTICS.

I have already mentioned one point which I wish to emphasize, viz., do not treat the membrane, it is only one symptom, but treat the patient. The totality of the symptoms, as emphasized by Hahnemann, is the only guide to our treatment. Nor is it necessary, as I have already shown, to destroy the bacteria, which exist in the pseudo-membranes and tissues, by poisoning or burning them. When the disease is cured, the fungi will disappear as the system no longer affords them a congenial habitat. The similar remedy given in the minimal dose is sufficient to accomplish this. Let us divest ourselves of the delusion under which some have labored that in dangerous cases the potentized remedy is inadequate. Dangerous and acute diseases require no more heroic treatment than do mild or chronic cases. Hering, Lippe, Guernsey and many others have testified to the efficacy of the similar remedy given in the minimal dose to cure this dreadful dis-

ease. It is a mistake to suppose that the high potencies are slower to act than the low or crude. On the other hand the vital powers react more promptly when the minimal dose is given than when the crude drug weighs heavily on them. There is an erroneous idea prevailing that deters many from administering high potencies, viz., that they require to be better selected than the low or crude, and that the latter will cure even if not accurately chosen. *If the remedy is not indicated it will not cure* if administered in either a small dose or a large one. Neither is alternation necessary in this or in any other disease. Alternation is made the excuse for careless prescribing. The physician says, "I cannot find a remedy that will cover the entire case, but I can get two or three that taken together do so." *More than one remedy cannot be indicated in a patient at the same time.* The probabilities are that not one of the drugs so given is indicated, but another. To illustrate: I was called to treat a girl for rheumatism contracted by being wet to her waist in water, all the time she was working. I found her suffering excruciatingly with pains all over her system. She complained bitterly of the pains caused by the slightest movement; they were so violent that she was compelled to scream on the least motion. Bryonia 200 was given. For the next two days there was no improvement. I then

learned that she was very restless; must be turned over every minute or two. Rhus 200 was now administered, still no improvement. At first sight this appeared like a case in which two remedies were indicated, but neither of them relieved. I then subjected her to a rigid cross-examination which I had before neglected to do, and learned that she was restless because she so soon became sore on the side on which she laid, or in other words "the bed seemed too hard." I then gave Arnica 1,000 which gave her prompt and permanent relief. Let us be more searching in the examination of our patients and better acquainted with the materia medica and all apparent need of alternation will disappear and those entrusted to our care will be cured with more certainty and less delay.

Cauterizations and gargles do no good whatever, unless the drug so used is the indicated remedy in the case, and if so, we have a much better way to administer it.

The epidemic influences need to be studied carefully and all the symptoms of every case of the disease should be collected to complete the totality of the symptoms. Hahnemann says in speaking of epidemics, "By carefully noting down all the symptoms observed in several cases of this description, the image that has once been formed of the malady will be always rendered still

more comprehensive. It neither becomes extended in a greater degree, nor lengthened in the detail, but it is made more graphic and characteristic of the peculiarities of the collective malady. On the one side, the general symptoms (such, for example, as loss of appetite, insomnolency, etc.,) acquire a still greater degree of precision; on the other, the special and more marked symptoms, which are even rare in epidemics, and belong elsewhere to a small number of diseases only, develop themselves and form the character of the disease. It is true that persons attacked with an epidemic have all a disease arising from the same source, and consequently equal; but the entire extent of an affection of this nature, together with the totality of the symptoms — a knowlede of which is necessary to form a complete image of the morbid state, and to choose according to that the Homœopathic remedy most in harmony with the *ensemble* of the symptoms — cannot be observed in the case of a single patient; in order to arrive at these, it will be requisite to abstract them from a view of the sufferings of several patients of different constitutions." Organon, section 102. No discoveries of modern medical science have superseded or even improved these instructions.

We also may be aided by studying other prevailing diseases. The remedy corresponding to the *genus epi-*

demicus may sometimes be discovered by searching for it amid the symptoms of other existing diseases. To illustrate, I passed through an epidemic of hooping cough in the spring and summer of 1875, at a time when Gelsemium was the epidemic remedy, curing intermittents, remittents, coryzas, etc. Our knowledge of that remedy in hooping cough is very limited. Dunham did not even mention it in translating Bœnninghausen's Hooping Cough. By studying the hooping cough alone, I never would have been led to the administration of Gelsemium by the light I then had, but by studying all diseases then prevailing as a unit, I gave that remedy with the most gratifying results. For in twelve hours it changed the cough to an ordinary catarrhal one that disappeared in a week.

The only remedies which can be indicated in diphtheria are those corresponding to adynamic and putrid diseases. Those corresponding to sthenic inflammations are contra-indicated.

AILANTHUS GLANDULOSA.

Fauces and Pseudo-Membranes.—Thick, œdematous, dry, choky feeling in the throat, which is livid and swollen; tonsils studded with numerous, deep angry looking ulcerations, exuding a scanty, fetid discharge. Throat dry, rough and scrapy.

Aggravation.—Throat tender and sore on swallowing, or on admission of air.

Concomitants.—Well marked delirium; more or less stupor. The neck is very tender and swollen. Torpor and stupor; low spirits prevail, very drowsy and restless which soon passes into insensibility, with constant muttering delirium. Great anxiety, vomiting with stupor. Fever of a low, adynamic type. Dark miliary rash. Great thirst, the tongue and lips being more or less cracked. The skin may be very hot or feel rather cool to the touch.

This powerful drug has been used but little, although it has a class of symptoms which indicate that it will be of great value in malignant cases, particularly in those complicated with scarlatina.

AMMONIUM CAUSTICUM.

Fauces and Pseudo-Membranes.—Deep redness of the velum, its pillar, tonsils, posterior wall of pharynx, are all covered with a white exudation as far as the eye can reach; intense pain in throat; great difficulty in swallowing.

Concomitants.—Irritable and fretful. Very hoarse, almost amounting to aphonia; low, gutteral, husky cough, with smothered whoop, followed by suffocative spells, with great anguish; weak; moaning in sleep;

hurried, labored anxious breathing; pulse very rapid, feeble, wiry; *remarkable weakness and exhaustion*, not in proportion to the short duration of the disease.

Has been used but little, we need further clinical provings to clearly establish its province in diphtheria.

APIS MELLIFICA.

Fauces and Pseudo-Membranes.—Tonsils studded with numerous, deep, angry-looking ulcerations, exuding a scanty, fetid discharge; bright red color of the inflamed fauces with puffy varnished appearance; *small amount of pain accompanying intense and extensive inflammation. The membrane has a dirty, gray color.* The first diphtheritic patches generally appear on the arches of the palate and the uvula. The uvula is œdematous and elongated. *Can bear nothing about the throat.* (Lach.)

Aggravation.—Throat tender and sore in swallowing and admitting air. When deglutition is painful, the pain always extends to the ears. *Heat is very unpleasant to the patient.*

Amelioration.—Cold water relieves the itching and stinging of the eruption, which is often present.

Concomitants.—Great debility characterizes the case even from the onset. Stupor. Very drowsy and restless, which soon passes into insensibility, with constant

muttering delerium. Great anxiety and restlessness. Puffiness and bloatedness of the subcutaneous tissue of the neck and face. *Thirstlessness.* Pain in the neck and shoulders, in the occiput, radiating in different directions, of a darting, cutting character, more external and on the affected side. Scantiness of urine, or there is excessive albuminous urine. The pulse is very quick, at least 140. *Perspiration frequently breaks out dries up, breaks out and dries again.* Low, adynamic, malignant type of fever. *Numbness of the feet and hands, and even paralysis.*

It is strange that this remedy should have been so often overlooked in this disease. Its chief points of action are like those of the disease, on the throat, the urinary organs, and the skin and both are characterized by depression and torpor, while the characteristics of both so often agree. In complications with scarlatina it promises much, and also in septic cases with weakness and torpor.

ARSENICUM ALBUM.

Fauces and Pseudo-Membranes.—The membrane is dry looking and wrinkled, and may cover the entire fauces. Great fetor from the diphtheritic deposits and oozing of blood from under the elevated portions of the thick membrane; ulcers extending to the roof of the

mouth; sensation of a hair in the throat; gangrene; fetid breath; burning in the throat; *great dysphagia.*

Aggravation.—Aggravation (general symptoms) from cold. All the symptoms are worse at night, particularly after midnight.

Concomitants.—Great anguish and restlessness, particularly after midnight. Restlessness; although very weak, the patient desires to have his position and even the bed or room frequently changed. He wants water often, but in small quantities; warm drinks are sometimes desired instead of cold ones. Exhausting diarrhœa and great anæmia; exhaustion and prostration; all the pains are burning and relieved by warmth; all the discharges are acrid and corroding.

This remedy while it may not be the most frequently indicated, yet is one that owing to its adaptation to the most malignant type of this disease has saved and will restore many more lives.

ARSENICUM JODATUM.

Fauces and Pseudo-Membranes.—Deposit covering mouth from fauces to outer edge of lips, and the external auditory canal; foul breath. Short, difficult respiration; pulse weak, slow; great prostration; bad odor from patient. Diarrhœa not at all at night, but the

urging commences on beginning to move about in the morning (Bry).

It has not been used much and will not be frequently indicated.

ARUM TRIPHYLLUM.

Fauces and Pseudo-Membranes.—Throat sore, excoriated, cannot swallow; excessive acrid salivation; sensation of something hot in the throat. The corners of the mouth, buccal cavity, and even the throat become raw and sore, emitting blood; so sore in fact that the patient refuses all food and drink, in consequence of the suffering occasioned by mastication or swallowing. The breath is very fetid, and the cavity of the mouth is covered with diphtheritic deposits and ulcers.

Aggravation.—Sensation of something hot in the throat, more especially during inspiration. Drink is refused on account of the great soreness of the mouth.

Concomitants.—There is very great restlessness, the patient crying and throwing himself into all sorts of positions. The discharges from the nose and mouth are very acrid and excoriate the skin whenever they come into contact with it. The lips become very sore and swollen and the skin peels off; the patient continually picks at these peelings, trying to pull them off, and thereby makes the lips bleed. Nose stopped up can

only breathe with the mouth open (Lyc.); swelling of sub-maxillary glands. *Picks his fingers and his lips and skin;* scanty urine; fever intense.

Adapted to diphtheritis scarlatinosa, and to septic cases. If indicated, it will save lives that nothing else will.

BAPTISIA TINCTORIA.

Fauces and Pseudo-Membranes.—Sensation of great fullness in the fauces; œdematous swelling of the affected parts, especially in affections of the posterior nares. But little pain in the throat. Constant inclination to swallow *not accompanied by pain;* dark putrid ulcers. He can swallow liquids only; dark pseudo-membrane in the throat; dark red color of the fauces which are greatly inflamed. Dark false membranes like wash leather covering the tonsils and fauces; breath exceedingly fetid.

Aggravation.—Can only swallow liquids. Oppressed breathing and suffocation relieved by the open air (Puls.)

Concomitants.— Semi-comatose condition. Occasionally delirium, with confusion of sight and almost complete deafness. Delirium, body feels scattered about, tosses around to get the pieces together. Face dark-red with a besotted expression. Great enlargement of

the parotid glands; great sinking sensation at the epigastrium with frequent fainting. All the discharges and secretions are fetid. In whatever position the patient lies the parts rested upon feel sore and bruised (Arnica). Adynamic fever with dark red face, dry lips and tongue, stupor, half finishes a sentence and then falls asleep.

Baptisia is indicated principally in septic cases with absence of pain, stupor, adynamia and fetor of all the discharges. One of the most dangerous forms of the disease.

BELLADONNA.

Fauces and Pseudo-Membranes.—The fauces are highly inflamed and *bright* red and shining, left side. Complains of dryness of the throat; continual desire to swallow, and sensation as if he would choke if he did not; stitches in the throat and fauces; great difficulty of swallowing solids or fluids. No exudation or only before it appears; swallowing painful, particularly of fluids.

Aggravation.—Great difficulty of swallowing which causes pain to run up into the ear. Every attempt to swallow causes lachrymation. Pain in the throat aggravated by turning the head; lying down aggravates the choking.

Concomitants.—Delirium alternating with deep sopor,

it is of a frightful character, with visions of spectres and persecutors. Head hot, face red, pupils dilated, conjunctiva injected, carotids throb, pains in the back; drowsy and yet unable to sleep; starts suddenly out of sleep.

Notwithstanding the routine use of this drug, it is one that is very seldom indicated, and then only at the beginning of the case, for Bell. produces and therefore cures only sthenic inflammations, and dynamic fevers in plethoric people, while with but few exceptions, and then only at the beginning of the disease, diphtheria is characterized by asthenic inflammation of the fauces and adynamic or septic fever.

BROMINE.

Fauces and Pseudo-Membranes.—When the disease commences in the larynx and comes up into the fauces, and in some cases in which it runs down into the larynx and produces a croupy cough, with much rattling of mucous. In either case there is rattling of mucous in the larynx, (Tartar emetic in the bronchia) on coughing and the cough has a croupy sound.

It may be indicated when the respiratory tract is invaded with the characteristic symptoms.

BRYONIA.

Fauces and Pseudo-Membranes.—Stitch in the throat when swallowing; stiffness of the neck, is afraid to move it, because motion aggravates the pain.

Aggravation.—Sitting up in bed causes nausea and faintness. Stitching pains in any part of the body, aggravated by motion.

Bryonia has not been much used in diphtheria, but it has proved itself curative in a few cases. It is rather indicated by the well-known concomitants than by the local symptoms.

CALCAREA CHLORATA.

This remedy has been used empirically with success, but the indications are too vague to be of much benefit. A good proving of the drug will give us the requisite information, and I doubt not it will prove a valuable remedy in this and other diseases.

CANTHARIS.

Fauces and Pseudo-Membranes.—Burning sensation in the throat, it seems on fire. The membrane appears in patches upon the posterior wall of the pharynx, with burning; swallowing very difficult; profuse salivation.

Aggravation.—Burning in the mouth extending down

the pharynx, œsophagus and stomach; worse from drinking cold water.

Concomitants.—The patient is uneasy, restless, distressed, dissatisfied; the pains external and internal are *fine stinging*, *burning* in character. Marked disturbance of the urinary organs; *constant desire to urinate with burning and cutting pain;* too copious or difficult urination; the urine contains shreds or coats of uriniferous tubuli; extreme prostration, sinking, deathlike turns; irritable looking rash upon the skin or shining through the epidermis.

Cantharis is a remedy of great value with close cut indications which prevent all but its willful abuse.

CAPSICUM.

Fauces and Pseudo-Membranes.—Burning and soreness of the mouth and throat; congested appearance of the mucous membrane. Sensation of contraction in the throat even during swallowing. The throat smarts as from cayenne pepper. Diphtheritic deposit covers a considerable portion of the fauces.

Aggravation.—Painful sensation in the throat when coughing. The pain in the throat is more between the acts of deglutition (Ign.)

Concomitants.—Cheeks red, not hot, but changing into paleness. Beating and throbbing in the head; vertigo

and bleeding at the nose. Glands of neck painful and swollen; chilliness in the back.

CARBOLIC ACID.

Fauces and Pseudo-Membranes.—No high local inflammation; no severe pain. Great accumulation of deposits, spreading a most offensive odor. Grayish, blueish membranes with a tendency to putrefaction; with a cadaverous stink and swelling of the cervical glands. Exudation extending into the larynx.

Fever, if any, adynamic. Great languor; weakness; great prostration; croupy cough and breathing; headache, especially in the forehead, or through the temples, as if from a tight band around the forehead; affection of the mucous membrane of the nose; face pale; weak pulse.

This remedy has usually been employed empirically without any special indications, and many times with happy results. It needs more pathogenetic proving when I doubt not it will prove a grand remedy in septic cases with torpor and fetid exhalations, and may also be useful in croupal cases.

IGNATIA.

The disease commences on the *right side* (Lyc).

Aggravation.—The soreness of the throat is greatest between the acts of deglutition (Caps).

Concomitants.—Delirium, characterized by tearfulness or dread; pains in the back of the head, nuchæ, and sometimes in the ears.

Only indicated in the simple variety with the characteristic symptoms.

IODIUM.

Fauces and Pseudo-Membranes.—Much pain in the throat; painful swallowing; salivation; strong fetor oris. Disposition to attack the larynx. A thick grayish white exudate covers the velum and tonsils, specks or patches of exudation. Thick, brown, croup-like exudation in the mouth and fauces.

Concomitants.—Swelling of the glands of the neck. Difficulty of breathing, cough and alteration of the voice.

It is only in rare cases that Iodine will ever be indicated.

KALI BICHROMATUM.

Fauces and Pseudo-Membranes.—The exudation extends into the throat and bronchia, producing a croupy cough, in paroxysms, *with expectoration of viscid, tough mucous, which may be drawn out into long strings;* the tongue is red, raw and shining; the fetor is very great; the deposit covers the throat, uvula, tonsils and even the

roof of the mouth, and is of yellow, grayish color. The patient becomes hoarse, indicating the extension of the disease into the larynx and air passages. The tongue is either quite red, or is covered with a thick yellow substance. On deglutition the pain shoots up to the ear and down the neck of the affected side. Deep eating ulcers in the fauces; throat purple with numerous isolated patches of greenish yellow exudation all over the fauces, tongue, cheeks, gums, and smelling like decayed meat; membrane in small patches; exudation tough and firmly adhering, spreading upwards into the nostrils; sensation of a hair on the root of the tongue (Arsen. in the throat), edges of which are red and full of small painful ulcers; increased redness and considerable sensitiveness of the still healthy parts of the mouth and fauces. The mucous membrane is deeply affected, and there is much ulceration; the mucus is frequently streaked with bloody exudation, pearly in appearance, elastic and fibrinous, thick well organized deposit, tendency of diphtheritic deposits on remote mucous membranes.

Aggravation.—Aggravation both of the local and general symptoms after sleep (Lach). He often wakens with a desire to cough or to hawk up detached portions of the diphtheritic deposit. Upon deglutition the pain shoots up to the ear and to the neck of the affected side. Throat pains more when putting the tongue out; sharp

shooting pain in the left tonsil, relieved by swallowing.

Concomitants.—The patient is in an almost unconscious condition. Swelling of the parotid and submaxilliary glands, measle like eruption. Great weakness; cachetic look.

This is an important remedy, particularly in affections of the respiratory tract, and other mucous membranes, especially if accompanied by the tough mucous secretions.

KALI (HYPER) MANGANICUM.

Fauces and Pseudo-Membranes.—Foul diphtheritic exudation all over the fauces. Throat dry, painful, with incessant attempts at deglutition, from which it seems almost impossible to refrain. Odor of breath unbearable. It is not indicated in the tenacious "kid leather" membrane.

Concomitants.—Fluids taken by the mouth are returned by the nose. Great dyspnœa; general and excessive prostration.

It is a promising remedy, but has been used but little except empirically.

LAC CANIUM.

Fauces and Pseudo-Membranes.—Pain in the right side of the neck. Pricking sensation in throat as if full of sticks (Nit. acid). Stinking breath. Exudate begins

in the left side and goes to the right (Lach); also when it begins in the right but is not very thick and is not accompanied by much inflammation, and looking as if lying loose. White ulcers on the tonsils, which together with the fauces are covered with a yellowish gray, curdy deposit; constant inclination to swallow; profuse saliva saturating the pillow. Tongue, fauces and tonsils all swollen and covered with a dirty coating. *Exudation diffused like the lid of a pepper box, and dry.*

Aggravation.—Worse by empty swallowing; on right tonsil and fauces; pricking and cutting pains through tonsils when swallowing; when swallowing solid food it seems to pass over a lump with sore and aching pains extending to and in left ear; great sensitiveness of throat to external touch (Apis, Lach).

Concomitants.—Prostration and lethargy. After the throat began to improve, the disease seemed to work through the whole alimentary canal for the vulva and surrounding parts were very much swollen, and every little while there would be involuntary discharge of diphtheritic matter from both vagina and rectum. Malignant cases with great prostration and entire loss of appetite. Constant desire to urinate (Canth). (Lach. seems indicated but fails.)

This remedy is yet on trial, but it comes into court with some good testimony. To those who are inclined

to reject it without a hearing, permit me to say, do not do so too hastily. Consider how many thousands have been cured by Natrum mur., Carbo veg., Lycopod., etc., I have not yet seen any cases that appeared to indicate it.

LACHESIS.

Fauces and Pseudo-Membranes.—Begins on the left side with tendency to spread to the right; the throat is very sensitive to touch or pressure; the subjective symptoms much severer than the objective; extremely painful and difficult swallowing; sensation of a foreign body in the throat, with stinging extending into the ear; pale redness of the fauces; membrane extends downward to the larynx; voice weak and hoarse; aphonia; purple, livid color of the inflamed parts, with dull, dry appearance, and little swelling. Membrane in large patches; white or yellowish exudate; pain in the throat, a great quantity of mucous *will stick* there and causes much ineffectual hawking and spitting.

Aggravation.—Worse after sleeping (Lac. can.); *worse from touching the neck or throat.* (Lac. can., Apis.) Empty swallowing aggravates pain in the throat more than swallowing of food; or fluids are swallowed with less pain than solids. Swallowing causes pain to run up into the ear along the exterior of the parotid gland.

Bending the head backwards causes pain in the throat.

Concomitants.—Great loquacity is only kept in check by the hoarseness; lassitude; muttering delirium; delirium, jealous, proud, suspicious, very restless, worse after sleeping; dullness of the cerebral symptoms; prostration and cardiac debility; *peculiar hard aching all over, so that position is constantly changed* (Arnica; Baptisia) fetor of all the discharges and secretions.

Lachesis is one of our most important remedies in both the laryngeal and septic forms. The indications are so clear that mistakes are inexcusable.

LACHNANTHES.

If the child has a *very stiff and painful neck, drawn to one side* with diphtheria.

The congestion, active delirium and febrile symptoms resemble those of Bell.

LYCOPODIUM.

Fauces and Pseudo-Membranes.—Begins on right or is worse on that side; much swelling and pain in throat, with spasms in swallowing; the appearance of the fauces is rather of a brownish redness; white or grayish membrane; begins in the nose and extends down the throat; feeling of constriction in the nose, throat and chest; fetor oris.

Aggravation.—Worse on right side; aggravation of

all the symptoms from 4 to 8 P. M., after sleeping (Lach.; Lac. can.) On awakening out of a short nap, he is very cross, kicks and behaves very naughty, or he jumps up in bed, stares about and knows nobody, seemingly dreaming with open eyes.

Concomitants.—Projecting tongue and silly expression; great fear of being alone; perfect stupor; grinding of teeth even when fully awake and during the heavy stupor; urine diminished, with red sand in it; inability to breath through the nose; fan-like motion of the alæ nasi; much rumbling in the bowels. He will get into position to urinate but must wait a great while before the water comes, accompanied by pain in the back which ceases when the urine flows.

Lycopod. is one of our most important remedies, the special indications are, beginning on the right side and affection of the nose. It is useless to use this below the 30th, better the 200th.

MERCURIUS BINIODATUS.

Fauces and Pseudo-Membranes.—Left tonsil swollen; fauces dark red; velum elongated; must swallow from a collection of saliva or mucous, or from a feeling of a lump in the throat; patches, mostly on left tonsil; livid purplish patches; exudation limited, transparent, and easily detached; enlarged glands.

Aggravation.—Worse from empty swallowing. On awaking throat sore (Lac. can. Lach).

Concomitants.—Desire to drink but small quantities (Arsen). Inclination to have the food more salted.

This remedy has been abused shamefully by the routinists; it has been given not even according to pathology, for there is little in common between the disease and the drug; it lacks the prostration of diphtheria, the putrid tendency, the disposition to extend to the respiratory tract; in fact the only points in which they agree is that they both affect the fauces, but in an entirely different manner. It never has been indicated nor has *it ever cured a case, except of the simple form,* where the inflammation was less asthenic than that of the septic type.

MERCURIUS CORR.

Fauces and Pseudo-Membranes.—The exudation covers the entire fauces and extends into the nose from which a profuse discharge flows; rapid destruction of parts.

This like all the Mercurials excepting the Cyanuret is destitute of the prostration and the profound affection of the fluids which characterizes diphtheria, particularly of the malignant form.

MERCURIUS CYANURET.

Fauces and Pseudo-Membranes.—Putrid diphtheria beginning in the nasal cavities and extending all over the mouth, fauces, pharynx and larynx which are covered with a grayish leathery exudation, and ulceration; incessant salivation; fetor oris; laryngo-tracheal whistling; voice extinguished; exudate white, gray, yellow or any shade between. Frequently the exudate is in places which can not be seen; gangrene; on the left side of the velum, close to the uvula, loss of substance of about half an inch in diameter, surrounded by a narrow, intensely red rim, the color of which contrasts with the purple tint of the neighboring membrane; the deficiency is filled with a slate-gray, soft substance, which hangs below the edge of the velum. A light exudation on the tonsils occurs with only moderate swelling, but particularly if the tonsils are covered with a thin membrane, as if flour was scattered over them.

Concomitants.—Engorgement of the parotid and submaxilliary glands; excessive prostration. Fever adynamic; complete suppression of urine, when the secretion returned it was albuminous; burning skin. Sopor, but when spoken to easily aroused.

This drug has been used empirically very extensively

and with excellent success, but we must not be led into the error of thinking that it is specific. The indications here given are mostly clinical. The drug should receive a better proving. The scanty pathogenesis in Allen's Encyclopedia suffices to show that the drug has a strong resemblance to a severe type of diphtheria.

MERCURIUS PROTIODATUS.

Fauces and Pseudo-Membranes.—Great difficulty in swallowing, with much pain in the throat; the salivary glands are very much swollen and painful; very offensive smell from the mouth, and fetid discharge from the fauces and nares; swelling of the cervical glands; coppery smell from the mouth; must swallow from a constant sensation of a lump in the throat; much painful hawking of stringy mucous; œdema of the neck and throat; burning in the throat; first the right then the left side. Easily detached patches on the inflamed pharynx and fauces; worse on the right tonsil. The posterior wall of the pharynx is red, irritated, inflamed and dotted with patches of mucous and small spots which look ulcerated. Pseudo-membrane located upon the tonsils, tongue, uvula, velum palati, pharynx and some portion of the alimentary canal. The deposit is of limited extent, of feeble organization, transparent, pellicular, albuminous and easily detached.

Concomitants.—Worse on empty swallowing.

A remedy that has been abused. Indicated only in mild cases with the characteristic symptoms.

MERCURIUS SOLUBILIS, OR VIVUS.

Fauces and Pseudo-Membranes.—A constant pressure in the throat if he swallowed, yet was obliged to do so because the mouth constantly filled with saliva. Exudation covers the entire fauces and extends into the nose, from which a profuse discharge flows.

Aggravation.—Angina with stinging pains, worse from empty swallowing, at night and in the cold air.

Concomitants.—Profuse salivation; *profuse warm sweat without relief;* swelling of the sub-maxillary glands; offensive breath.

This is frequently indicated in mild cases, but it lacks the prostration and septic conditions of the malignant ones.

NATRUM MURIATICUM.

Fauces and Pseudo-Membranes.—Swelling of the sub-maxillary glands and lymphatics; map tongue; burning in the throat; after application of caustics, especially Nitrate of Silver. Post-diphtheritic paralysis of the muscles of the throat.

Concomitants.—Violent thirst; fever blisters; aching

in the bones; *longing for salt; vivid dreams, the impression continuing after awaking.*

NITRIC ACID.

Fauces and Pseudo-Membranes.—Ulcers in the mouth with stinging in them as if from splinters (Lac. can); difficult deglutition, and very painful; excessive salivation; fauces and glands swollen; fetor oris; membrane extending to the nose; deep-seated local affection.

Aggravation.—Much pain when swallowing.

Concomitants.—Great uneasiness; stoppage of the nose, with discharge of acrid fluid and hoarseness (Arum tryph); violent fever.

This powerful drug has been neglected.

PHYTOLACCA DECANDRA.

Fauces and Pseudo-Membranes.—Particularly when there is a sensation in the throat as if a hot substance were there continually; as though a red-hot ball of iron were lodged there; livid exudation upon tonsils and fauces; exudation mostly of a grayish color; difficult deglutition and extreme sensitiveness of the nostrils; tonsils, soft palate and fauces highly inflamed, very much swollen, sore and sensitive; breath offensive; deglutition almost impossible.

Aggravation.—Cannot take hot fluids. Cannot stand;

when rising up in bed faint and dizzy; pain at root of tongue on swallowing.

Concomitants.—Much frontal headache; great prostration; *pains all over and feels very weak;* chills during evening and night; albuminous urine; stiffness of the neck; weakness of the upper extremities, especially with drowsiness.

This remedy has been used indiscriminately. The indications are now clear enough to enable us to avoid such practice.

RHUS TOX.

Fauces and Pseudo-Membranes.—Bloody saliva runs out of the mouth during sleep. Sticking or stinging pain in tonsils. Right tonsil covered with yellow exudation.

Aggravation.—Worse when beginning to swallow.

Concomitants.—Typhoid condition with thirst (without Apis). Parotid glands are a good deal swollen. The child is restless, wants to be carried about, wakes up every now and then complaining of pain in the throat; transparent jelly-like discharges from the bowels at stool, or afterwards. Aching all over worse when first beginning to move.

Rhus has characteristics that if found in the patient, makes its selection very easy and accurate.

SALICYLIC ACID.

Fauces and Pseudo-Membranes.—Burning in the throat; swelling of the right tonsil with sensitiveness when touched; violent efforts to swallow, with difficulty in doing so; the pain and difficulty of swallowing are confined to the right side of the throat with sticking pain extending along the Eustachian tube to either ear; the exudate is soft.

Concomitants.—Excessive weakness and prostration.

This remedy has been used empirically to a considerable extent. I doubt not that when well proven it will have a useful sphere in this disease.

SANGUINARIA.

Fauces and Pseudo-Membranes.—Heat in the throat; throat so dry it seems as if it would crack; burning in pharynx and œsophagus; when the membrane is diffluent; not when it is tough and closely adherent; pearly coating on palate and fauces.

Aggravation.—Burning especially after eating sweet things. The heat in the throat is relieved on inspiring cold air.

Concomitants.—Anxiety; moroseness; irritability; *feeling as if hot water was poured from the breast to the abdomen.*

This remedy has been but little used in diphtheria, although its pathogenesis indicates that it will cure certain cases.

SULPHUR.

Fauces and Pseudo-Membranes.—Swallowing very difficult, liquids run out of the nose; profuse salivation the taste of which causes nausea and vomiting; all the trouble seems to be caused by the nauseous salivation; the inflamed parts are not bright red but purple. Large yellow deposits all around the *posterior wall of the pharynx* which is ulcerated and sloughing. Dryness of the throat and a constant desire to swallow saliva to moisten the affected parts. The pain and soreness may be quite severe and even extend into the ear.

Aggravation.—Empty swallowing more painful than that of liquids.

Concomitants.—Flashes of heat, frequent sinking spells. The eruption if present, itches, especially when becoming warm. Very frequent desire to urinate, almost constant urging; the pain caused by urinating scarcely ceases till he is again obliged to micturate and the pain returns (Canth). Fever with sharply circumscribed redness of the cheeks (especially the left one). Slow cases in scrofulous patients. *Burning of the feet,*

must put them out of bed. Sulphur is indicated mostly in those cases in which there is latent psora.

This remedy is too frequently overlooked in this and other acute diseases.

SULPHURIC ACID.

Fauces and Pseudo-Membranes.—Excessive salivation; fetor oris; swallowing difficult, liquids run out of the nose; ulcerations of the throat with large exudations, thick, grayish or yellowish, sticky and tenacious.

Concomitants.—Apathy; excessive paleness; somnolency; *much debility with sensation of trembling all over the body without actual trembling.* Cases of aphtha which become diphtheritic; breathing difficult on account of the accumulation in the fauces.

The indications for this remedy are few but well marked.

CHAPTER X.

SANITARY ADJUVANTS.

Having selected the remedy, attention should be given to the sanitary care of the patient. As regards this vital subject we must in this as well as the medical treatment, follow the guidance of nature. The patient's inclinations should be closely studied. Never coax nor press him to eat, as long as there is no appetite he should eat nothing. If he has a desire, do not require him to eat anything he does not like, and remember that the sick very soon tire of dishes and should have a constant change. His appetite as regards quantity may need in convalescence some restraint put upon it. As regards desiring indigestible and injurious dishes, if the desire amounts to a longing, give it to him, with this qualification; for instance, there is very often a desire for acids, and he will ask for vinegar and pickles, instead, give him the fruit acids, lemon juice, lemonade, cranberry sauce, currants, etc. These will gratify him and not hurt him. Fresh and canned fruits may be given *ad*

libitum. Light, nourishing dishes constantly changed should be given in preference. Coffee, should as a rule be prohibited. Tea may be allowed. Milk give freely. Water should never be refused. There is a nourishing drink that I have long used for the sick with gratifying results. Prepared in the following manner: Make a glass of lemonade, sweeten to patient's taste; pour it into a quart glass fruit jar, add a fresh egg, and shake till it is all in foam. It is very pleasant, extremely nourishing, and more easily digested than anything that can be given.

Keep the patient clean, change his clothing and that of the bed frequently, taking great care to dry and air the clean clothing. Whenever the skin is hot and dry sponge him off with a cloth dipped in water, and wrung so as not to drip, the temperature of the water should be according to his liking. This is very refreshing, promotes cleanliness, abates the fever, and assists the secretions of the skin. Ventilate by letting a window down from the top, if possible in an adjoining room or hall, so that the draught will not touch him. Keep the temperature of the room to his liking, even if it be below freezing point or over a hundred, and above all do not attempt to "sweat" him by keeping uncomfortably warm.

In malignant cases, extra attention should be given

to ventilation, and at the same time to protection of the attendants, so that they will not be infected by the poisoned atmosphere. In case of death, the room, clothes, and bedding should be thoroughly washed, and if possible, whitewashed. Lime is the best available disinfectant.

CHAPTER XI.

AUXILIARY MEASURES.

TRACHEOTOMY.

In conclusion let us examine the various surgical and mechanical and chemical expedients that have been employed in this disease. The most important is tracheotomy. In order to give us a basis for considering the propriety of ever resorting to this operation, I have collected 822 cases in which it was resorted to.

OPERATOR.	TOTAL CASES.	DEATHS.	RECOVERIES.
Von Nussbaum	14	12	2
Jacobi	117	104	13
Gendron	2	2	0
Seitz	6	5	1
Bartels	49	37	12
Physicians of Kiel	61	44	17
Von Koopl	17	6	11
Ebert	8	8	0
Barbossa	2	0	2
Kunze	6	6	0
Kinderklinik der Charite	13	7	6
Isambert	48	38	10
Rodger	294	229	65
Barboss and others	38	26	12
Hillier	3	3	0

OPERATOR.	TOTAL CASES.	DEATHS.	RECOVERIES.
Buchanan	21	14	7
Frobelius	2	2	0
Foerster	2	2	0
Classen*	3	2	1
Montes	30	27	3
Gueterbock	84	52	32
Balnassa	2	2	0
Total	882	628	194

Dr. Henoch operated on a large number, all died but two; giving about 23.5 per cent. of recoveries. It may be urged against this table that other results of tracheotomy are more favorable. These figures are of operations in diphtheria, which are much more fatal than those performed in croup. Bartel's experience in tracheotomy was that when performed in croup almost the half lived, while in diphtheria of forty-nine operated on, only twelve recovered. With these figures before us, the question arises, are we justified in resorting to this operation? I think not. We need further data to definitely settle all the phases of the case. If we have to decide whether the 23 per cent. who recovered were saved from death, or whether a larger number would not have lived without the operation, we must remember Dr. Classen's cases. True, the number is too small for us to give an authoritative decision, yet one

* Dr. Classen had six other cases in which stenosis of the larynx set in, which the parents refused to allow the operation. *All recovered.*

thing is clear, from his experience all those who reach that point at which tracheotomy should be performed, according to the light then at hand, do not die, for the four on whom he wished to operate, but where consent was refused all lived; while of the three on whom he operated, two died. I am positive that good Homœopathic treatment will rescue a much greater number than tracheotomy of these apparently moribund cases. There are two reasons contributing to induce us to refrain from the operation. First, the pseudo-membrane may extend below the incision in the trachea, or it may involve that opening, and thereby render the operation unsuccessful. All the experiments that have been made of removing the exudation, even from the fauces, have proven useless or worse. Second, the great liability of the wound becoming diphtheritic which is almost certain death. The fatality after the operation is much greater in children, so that some of those physicians of the above list who operated extensively, concluded that the operation before puberty was certainly fatal. Therefore profiting by this experience we must certainly conclude that we should not operate in children at least.

It has been tried in some cases to introduce an instrument into the larynx and to remove the pseudo-membrane there. Oertel approves the proceeding. He says that he tried it in eight cases, three of whom re-

covered. This is not an encouraging result, and the number of cases is too small to give the experiment much weight. Seitz, on the other hand, says: "*Every local irritation of the throat, even by soft sponges and fine brushes in the later stages of the disease when the patient is already weakened*, we consider a dangerous interference, as we saw thereby such a violent vomiting produced that the patient lay a long time in a faint. This is explainable by the fatty degeneration of the heart which has been shown by many autopsies after a long continuance of the disease." Croup und Diphtheria, Seite 477. The disposition to a reproduction of the pseudo-membrane is too well established to render the experiment at all justifiable.

INHALATION.

There is only one expedient of any importance remaining to be mentioned, viz., the solution of the pseudo-membranes by bringing agents in contact with them by inhalation. We have mentioned the experiments that were instituted to test the effects of different articles on the exudation. There was only one that had any appreciable effect, viz., lime water. This I have never tried, but think that it might be used in those cases where the air passages are invaded and all the indicated remedies have failed to relieve, this might be

employed as a *dernier resort.* As this is only to obtain the chemical action of the lime water on the membrane, it will be necessary to employ it in the requisite strength to accomplish this purpose. Oertel says, "It should be used by inhalation. If there is no atomizer at hand the ordinary toilet spray producer may be substituted. The officinal aqua Calcis* should be thus used for ten or fifteen minutes every half hour until respiration is easier, then use occasionally if the dyspnœa returns. If the prepared lime cannot be obtained, the fresh lime may be slacked in hot water and the steam inhaled by the patient.

[* Liquor calcis or Aqua calcis is prepared as follows: Fresh lime 4 oz. Aqua distilla 8 pints. Pour the water on the lime and stir. Let it stand in a covered vessel three hours; bottle the lime and water in stoppered bottles and use the clear solution Ph U. S.]

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